# *IP RECEIVER*

## *Model GRx2*

## *Instruction Manual*

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# 1 Introduction

The GDD IP Receiver is a new compact, low consumption unit designed for resistivity measurements. It features high capabilities allowing it to work on any field conditions. It can be configured in multi-pole or multi-dipole reception.

The receiver uses a PDA handheld PC to process data acquisition. A WVGA LCD TFT display allows monitoring the results live on the field. The operating system is Windows Embedded Handheld 6.3 and the software can easily be updated via internet.

**Caracteristics:**

- **Reception poles/dipoles:** 2 poles/dipoles, expandable to 32, for dipole-dipole, pole-dipole or pole-pole arrays.

- **Programmable windows:** The GRx2 offers twenty fully programmable windows for a higher flexibility in the definition of the IP decay curve.

- **User modes available:** Arithmetic, logarithmic, semi-logarithmic, Cole-Cole, IPR-12 and user define.

- **IP display:** Chargeability values, Resistivity and IP decay curves can be displayed in real time thanks to the VGA screen. Before data acquisition, the GRx2 can be used as a one channel graphic display for monitoring the noise level and checking the primary voltage waveform through a continuous display process.

- **Internal memory**: Over 64 000 readings can be stored in the internal memory of the PDA. Each reading includes the full set of parameters characterizing measurements. Data are stored on flash type memory and can not be lost even if the battery of the PDA is totally discharged or absent.

# 2 GRx2 accessories

| | | |
|---|---|---|
| A | 1x | 2 channels GRx2 IP receiver unit |
| B | 1x | Archer2 Field computer with one rechargeable 10600mAh Li-Ion battery, one hand strap and one capacitive stylus |
| C | 1x | GRx2 IP receiver wall charger with international plug kit (universal voltage) |
| D | | Red and black banana cables |
| E | 1x | Archer2 AC charger with international plug kit (universal voltage) |
| F | 1x | Rugged serial communication cable 9 pos D-SUB female - 9 pos. D-SUB female |
| G | 1x | Archer2 micro USB sync cable |
| H | 1x | Screwdriver (for Archer2 battery cap) |
| I | 1x | External GPS antenna (SMA connector) |
| J | 1x | Archer2 Field PC Quick Start Guide |
| K | 1x | GRx2 Instruction Manual and GRx2 Utilities CD (contains GDD Rx software, Sync softwares, GRx2 manuals, Archer2 manual) |

Optional:

- Allegro Mx basic kit
- Allegro Mx complete kit
- Archer2 Field PC spare battery
- Spare channel

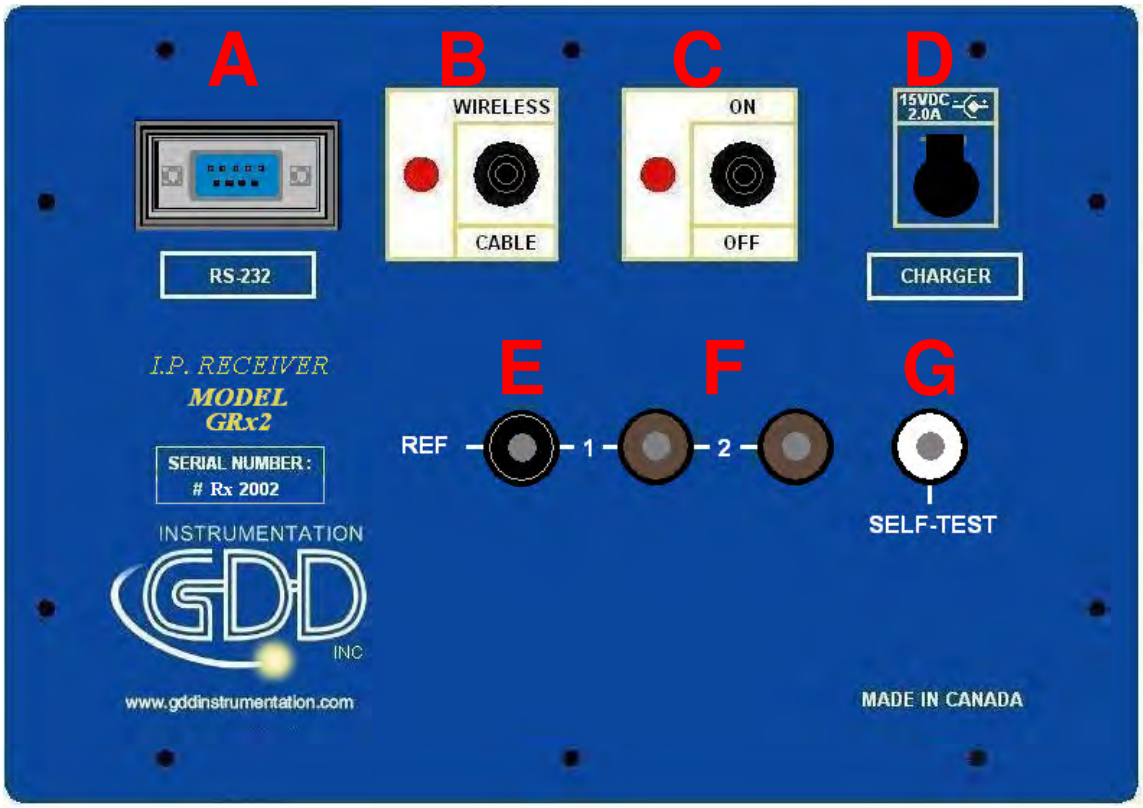
Allegro Mx PDA complete kit

A
RS-232
CABLE
OFF
CHARGER
SELF-TEST
GDD

H
B
Rx1235
J
IP RECEIVER
K
E
I
C
G
F
D

# 3 GRx2 components

The GRx2 components are described in this section.




**A - RS-232 connector - 9 pin serial communication port**

This connector is used to connect the RS-232 cable between the Archer2 Field PC and the GRx2 receiver.

**B - CABLE/WIRELESS switch**

This switch is used to select CABLE (RS-232) or WIRELESS (Bluetooth) communication with the PDA. The red light indicates WIRELESS position.

**C - ON/OFF switch**

This switch is used to turn the GRx2 ON. The red light indicates ON.

**D - CHARGER connector**

This connector is used to charge the battery of the receiver with the wall power supply.

**E - REF terminal**

This terminal is the infinite electrode in pole configuration. In dipole configuration, this terminal is the first electrode in differential with the second electrode.

**F - NUMBERED terminals**

These terminals are referenced to the Ref terminal (infinity in pole configuration). In dipole configuration, the numbered terminals are differential terminals.

**G - SELF-TEST terminal**

This terminal is used to perform a self test.

**H - GPS connector (SMA)**

This connector is used to connect an external GPS antenna (SMA).

# 4 Power

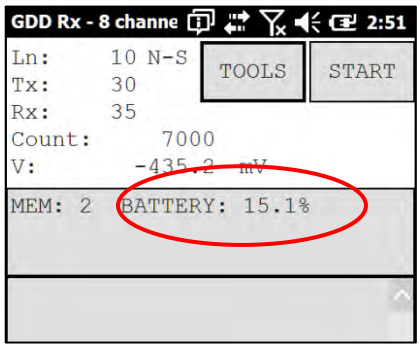
GDD's GRx2 I.P. Receiver is powered by internal rechargeable lithium-ion batteries.

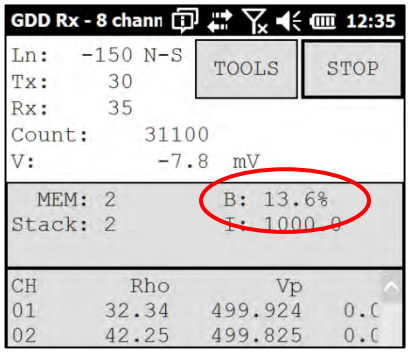
Here are a few tips for using and storing your lithium-ion powered receiver:

Usage

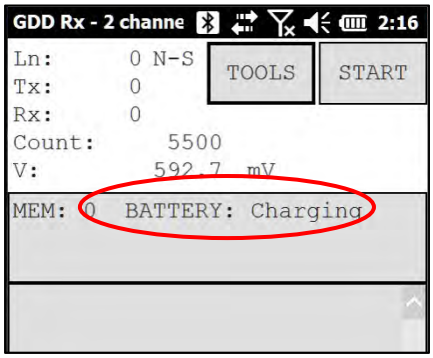
- **Using a different battery power supply than the one supplied by GDD could damage the batteries and the receiver.**
- **The connector labelled CHARGER is used only to recharge the internal batteries.**
- **Do not replace the receiver internal batteries without the authorization and advice from GDD's technicians.**
- The total operating time of the receiver will depend on the environmental conditions. Using the receiver in very cold weather (-20$^0$C to –40$^0$C) will lower the operating time.
- The receiver will turn itself off when the batteries reach a critical level.
- To extend battery life, avoid frequent full discharge and charge more often between uses.
- The power level of the batteries and the charging status appear on the main screen of the Archer2 Field PC when using the GDD Rx program.

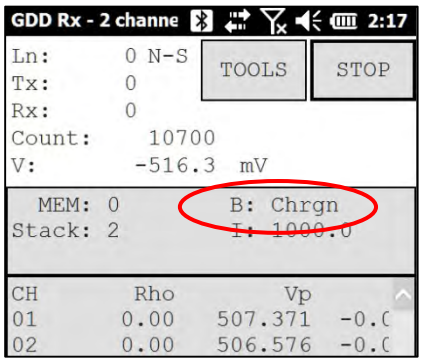
Power level



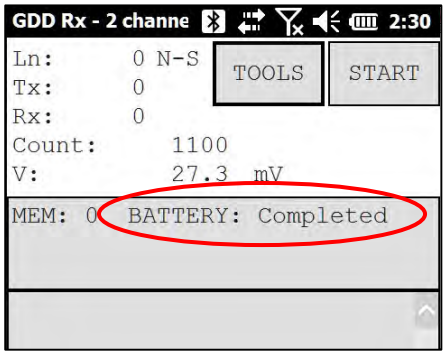



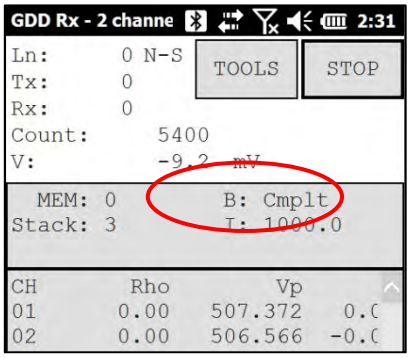

Charging



Charge completed




Storage

- To avoid permanent capacity loss, store the receiver and the external battery pack at 40% charge.
- Store the receiver and the external battery pack in a cool and dry place.
- If stored for several months, check the batteries charge level every six months and recharge them up to 50% if they are below 30% charge.
  Never store fully charged or completely discharged Lithium-Ion batteries for an extended period of time.

# 5 Quick start guide

**Important note :** Using a finger may still be the preferred option for projected capacitive screen technology, but we understand a stylus may also be necessary (like when it's cold). The way you hold a capacitive stylus really impacts how it works. To register a point, it is like the screen is taking a sample from which to calculate the position. It then snaps to the closest line on a grid. If you hold a capacitive stylus at an angle, it registers less area and does not calculate your true position as well. For best results on a capacitive screen like the Archer2, hold the stylus as perpendicular to the screen or straight up as you can. In this section, you will see some tips to use the Archer2 keypad to perform some actions of the GDD Rx program.

1. Connect electrodes into terminals.

2. Turn ON the IP receiver using the ON/OFF switch on the GRx2 panel.

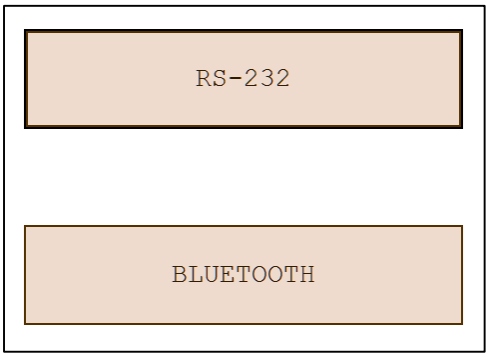
3. Select the communication mode using the CABLE/WIRELESS switch on the GRx2 panel.

4. Connect the RS-232 cable between the Archer2 Field PC and the GRx2 RS-232 connector (CABLE communication only).

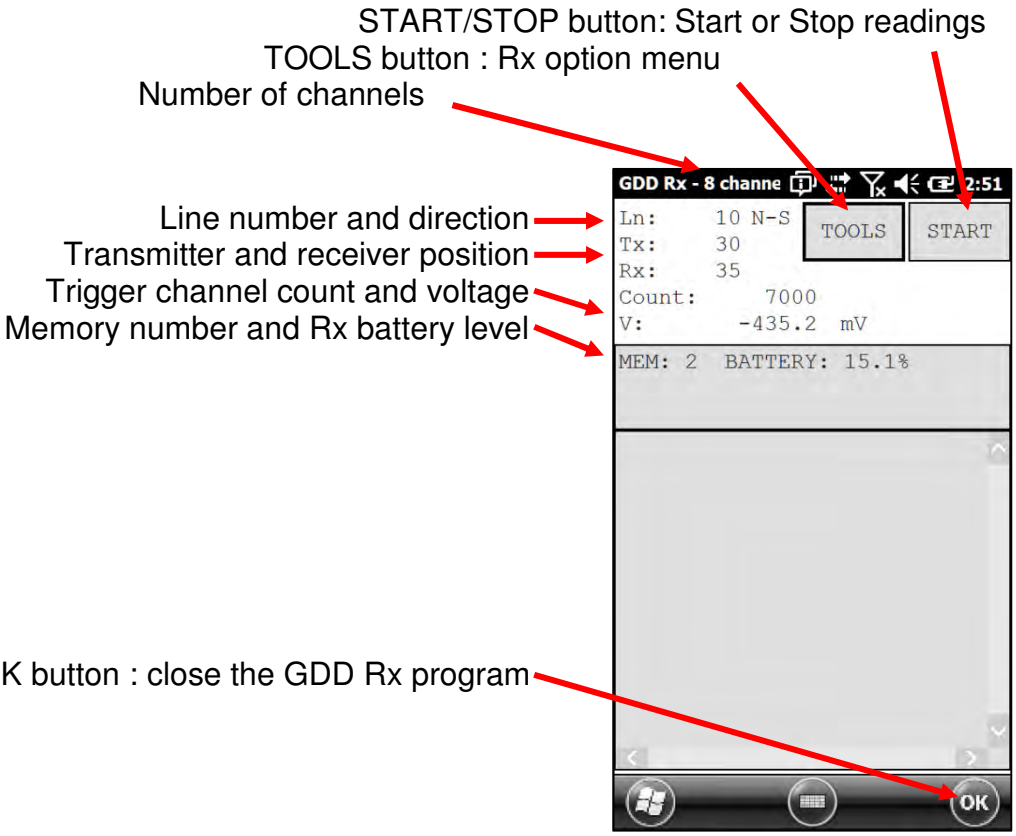
5. Turn ON the Archer2 Field PC with the ON/OFF key.

6. Tap on the GDD Rx program icon in the Favorites bar of the Home Page.

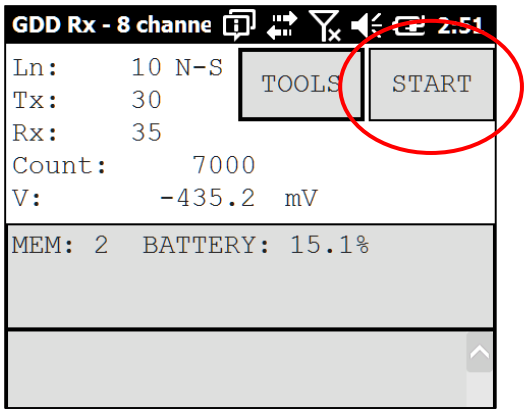
7. Select the communication mode: *RS-232* (CABLE) or *BLUETOOTH* (WIRELESS). You can move back and forth between the different actions using the tab button (⇥) of the keypad. Press Enter button (↵) of the keypad to perform the highlighted action.



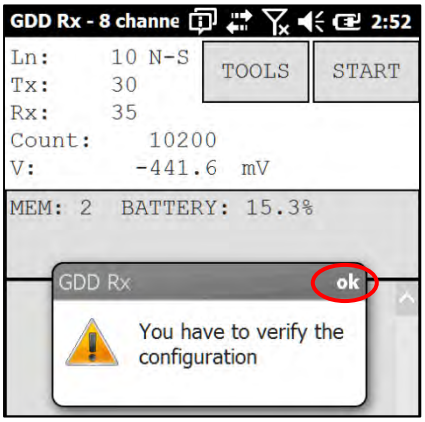
8. The following screen appears.



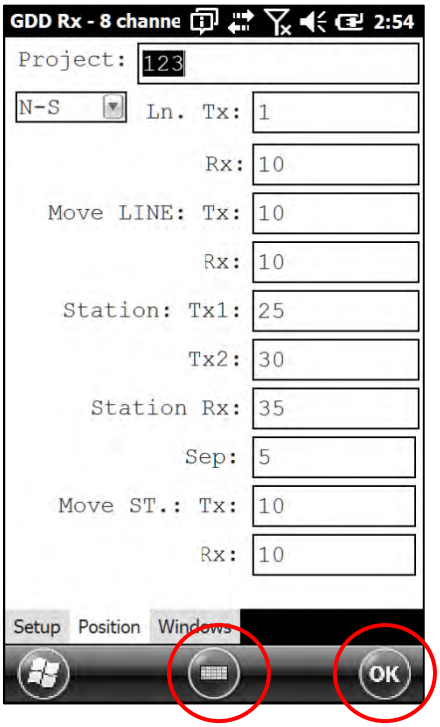

9. Click *S*TART (or press ➔|, and ↵ on the keypad) to begin the acquisition procedure.



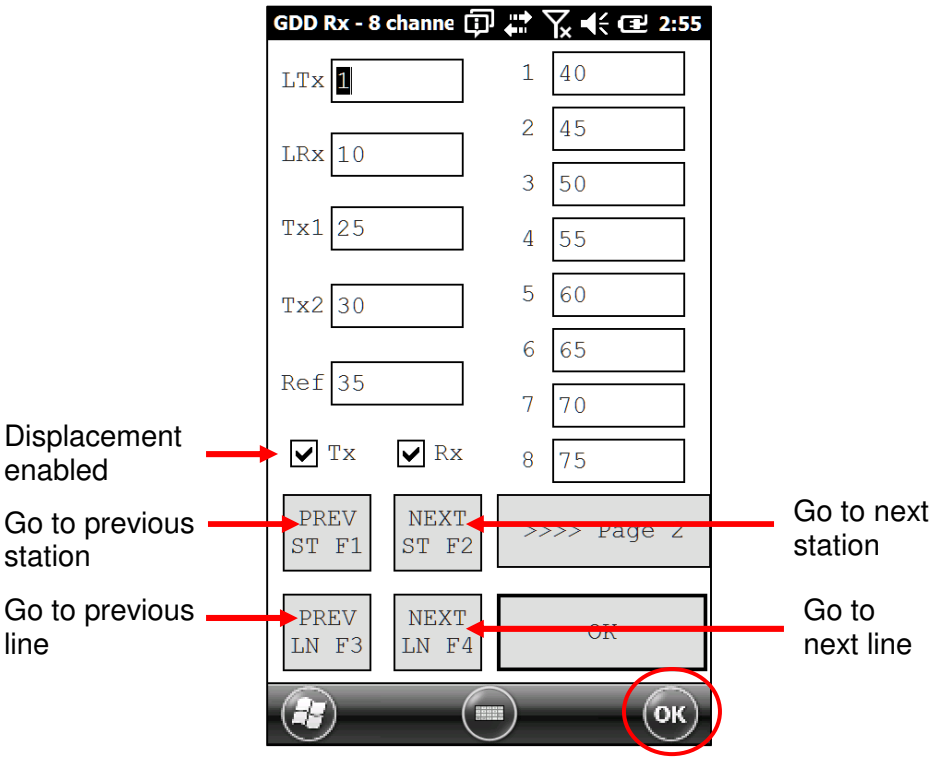
10. The following screen appears. Tap OK to continue.




11. Enter the project, line, station, move displacement, etc. for Tx and Rx. Use the virtual keyboard at the bottom of the screen or use the numeric keypad of the Archer2 Field PC to enter numeric values. Use the tab button (⇥) to advance the cursor to the next tab stop. Click OK (or press shift ⇧+5 *OK* on the keypad) to continue.

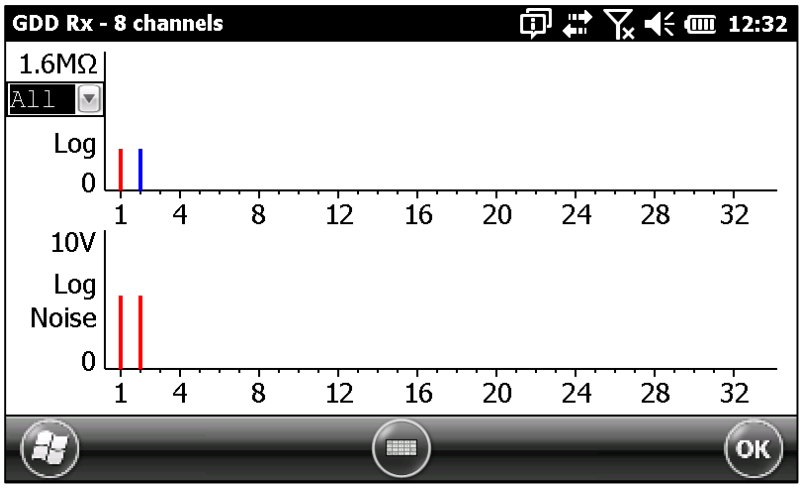


12. Verify if the positions are correct and click OK (or press shift ⇧+5 *OK* on the keypad) to continue.



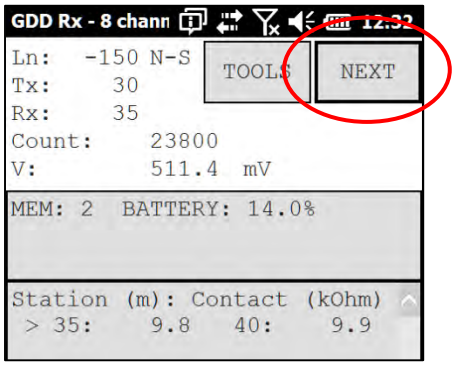

**Note :** F1 to F4 shortcut key are not available with the Archer2 Field PC.

13. The Contact and Noise graph appears. If the values displayed are normal, click OK (or press shift ⇧+5 *OK* on the keypad) to close the window.

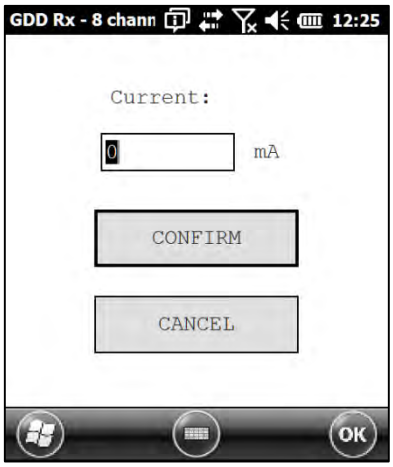


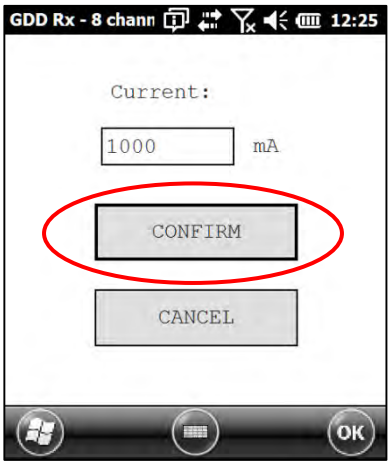
14. Click NEXT (or press Tab ⇥, and Enter ↵ on the keypad) to continue.

*Note: If all stations show an INFINITE contact, the reference electrode might be disconnected.

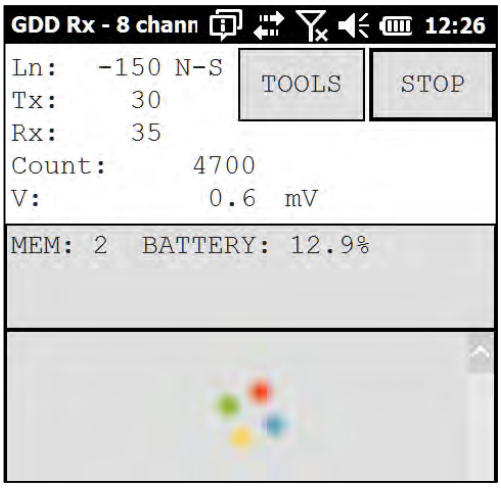


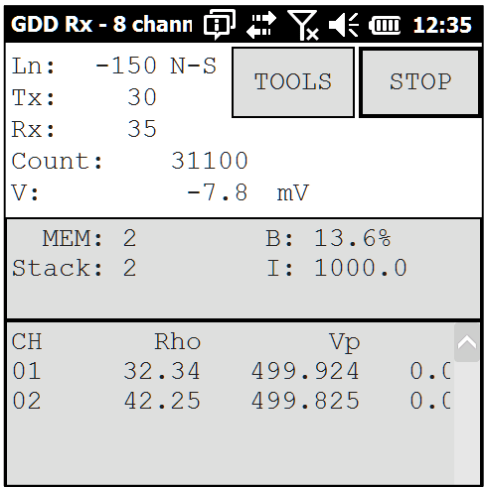

15. Enter the transmitter current and click CONFIRM to start the readings.



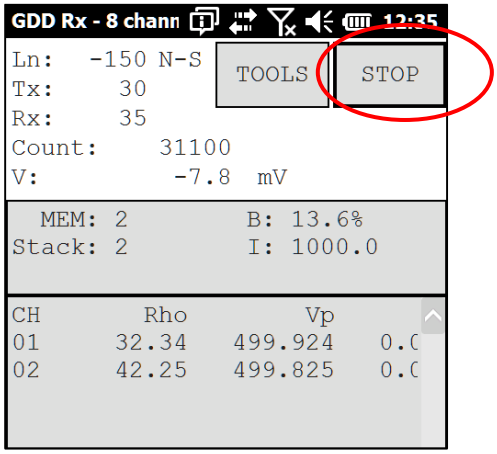




16. The following screens appear.

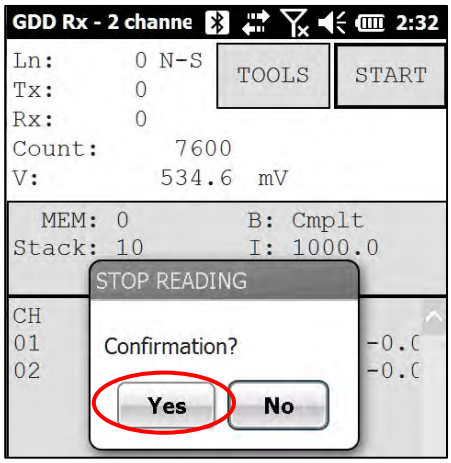


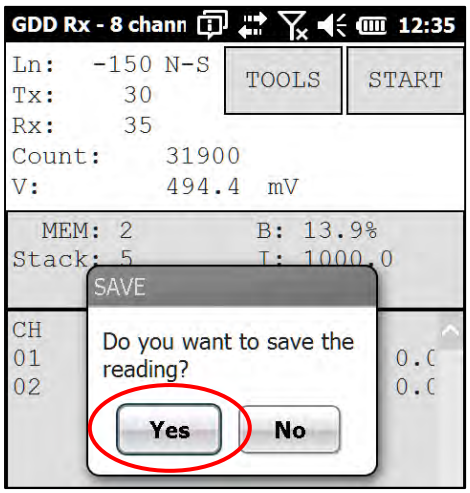
17. Click STOP or wait until the end of the acquisition to stop the readings and save the data.




18. Click YES to confirm the operation.

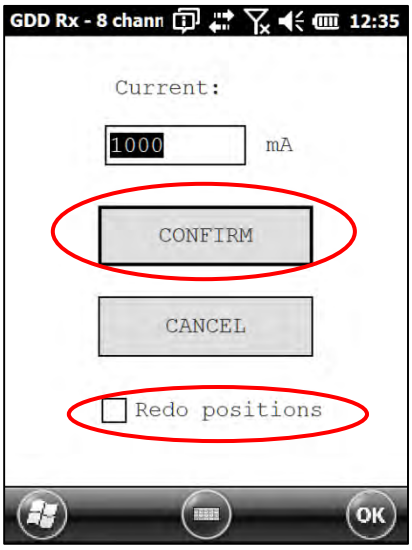



19. Click YES to save readings into the memory.



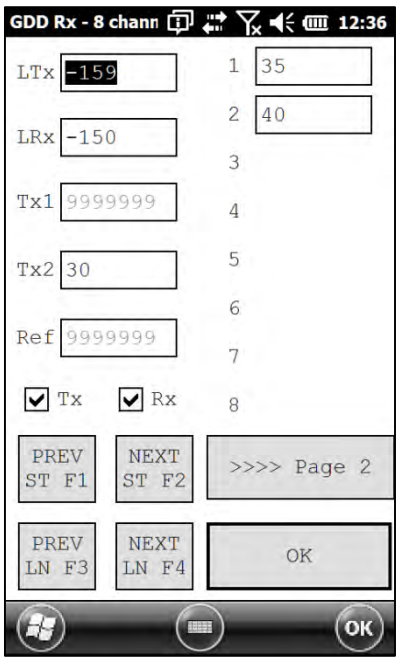
20. Check the REDO POSITIONS option to change the transmitter or receiver position.

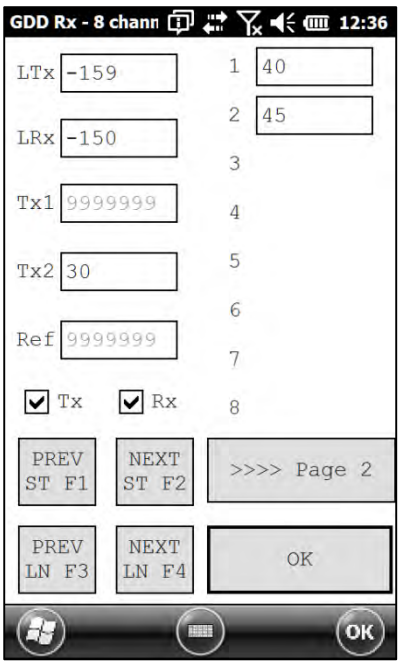
    Change the current value if it has changed and click CONFIRM to save the current value.



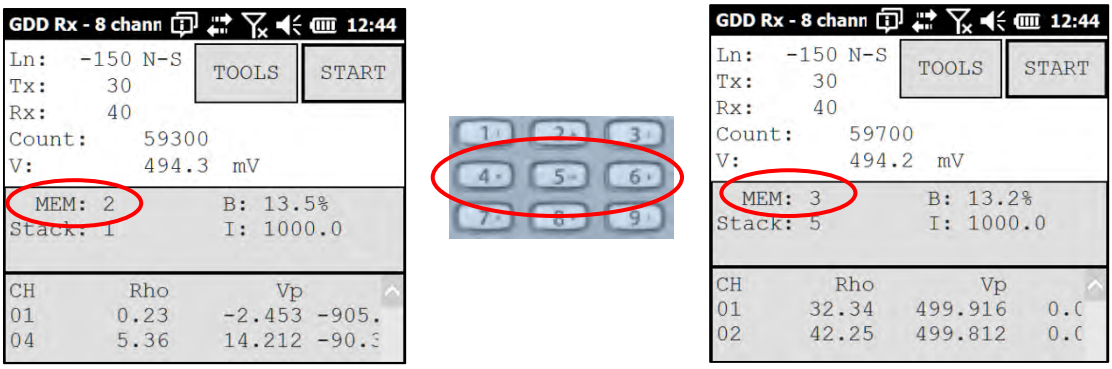

20.1. If the REDO POSITIONS option is checked, enter the transmitter and receiver position and click OK.

    *Each position can be changed individually or moved by clicking Next or Prev.



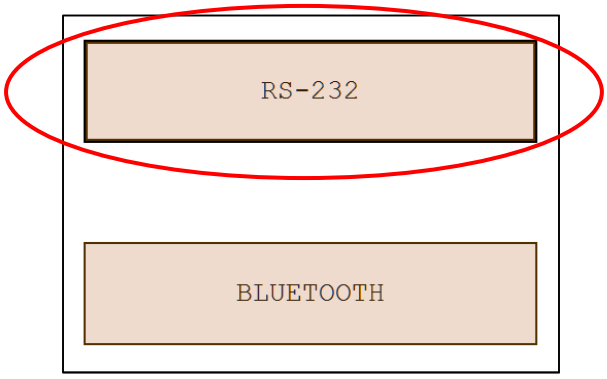
**Once your acquisition is finished, use Left and Right arrow buttons (shift ⇧ + 4◀ or 6▶) to compare your current data with that of your previous acquisitions. Use the Up and Down arrows to see all the channels. By clicking on Start, the program will automatically come back to the last acquisition and will start a new acquisition procedure.**



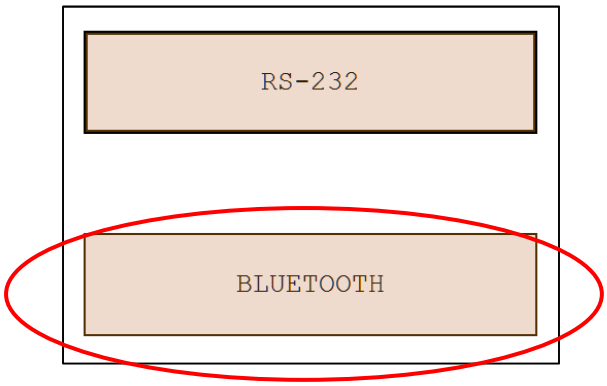

21. Repeat steps 9 through 19 to take another set of readings.

# 6 RS232/Bluetooth communication

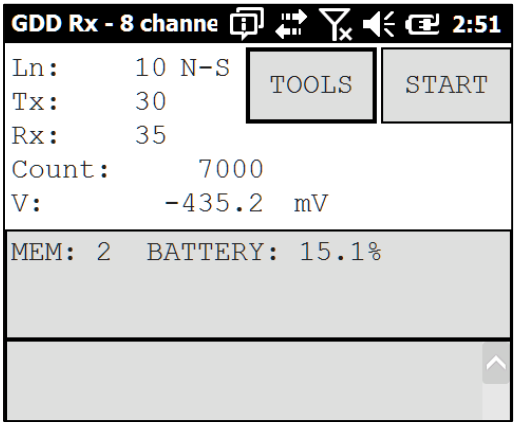
1. Select the "RS-232" communication mode to use the GRx2 with a serial communication cable.




2. Select the "BLUETOOTH" communication mode to use the GRx2 with a wireless connection.



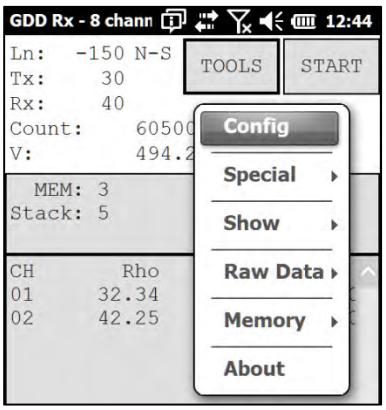

3. The following screen appears and you are ready to begin.




In Bluetooth mode, if a "COM Error" message appears, see *Section 12 – Troubleshooting*.

# 7 Tools menu

Click TOOLS to select one of the following options or press ⇥, and ↵ on the keypad to open the Tools menu, and press shift ⇧ + 8▼ or 2▲ to highlight the different options. Then press ↵ to open the highlighted option.




**Config**

Use the CONFIG option to change:

- Staking parameters
- Electrode array
- Active channel
- Trigger channel
- Line number and position
- Transmitter and receiver position
- Signal timing
- Mode

**Special**

Use the SPECIAL option to:

- Re-init the GRx2
- Test the GRx2 with the internal simulator
- Set signal processing options
- Select battery type (if not automatically detected)

**Hotkeys**

Use the HOTKEYS option to display the shortcut keys menu

**Show**

Use the SHOW option to display:

- Signal graph
- Contact and Noise monitor graph
- Vp and Cycle synchronization graph
- Decay curve
- Windows chargeability
- SP (self potential)

**Memory**

Use the MEMORY option to:

- See the History
- Recall the previous memory
- Clear the memory
- Save data in a file

**About**

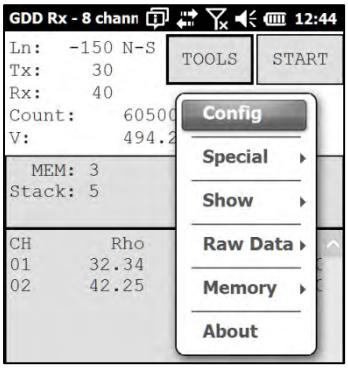
Use the ABOUT option to display GDD Rx software version number.

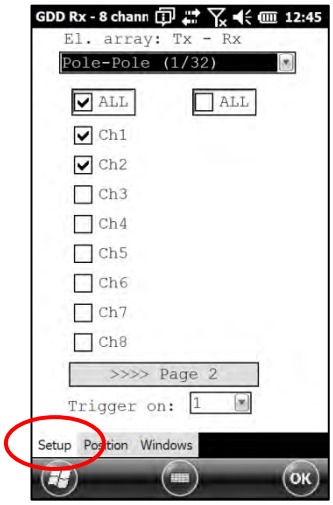
## 7.1 Config option

### 7.1.1 Setup

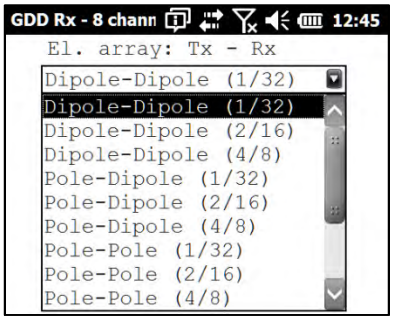
The SETUP option is used to set the electrode arrays, the active channel(s) and the trigger channel.

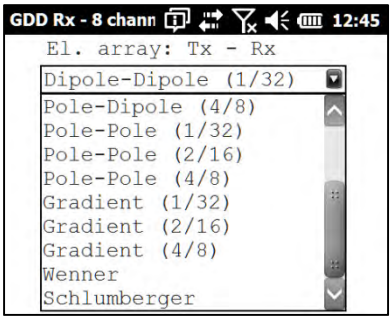
1. Select Tools | Config | Setup, the following window appears.



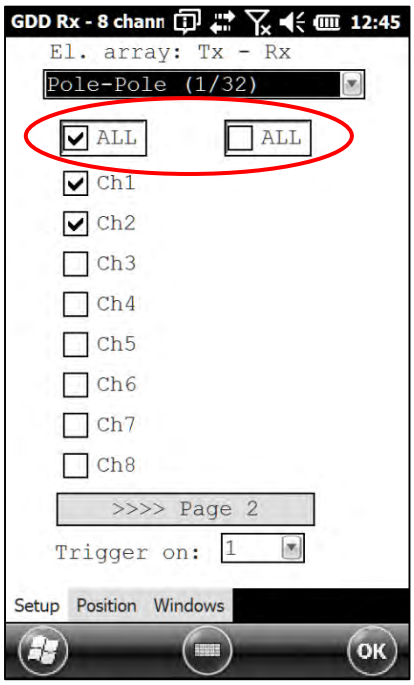

2. Select the electrode arrays configuration.
   - Dipole-Dipole (1/32)
   - Pole-Dipole (1/32)
   - Pole-Pole (1/32)
   - Gradient (1/32)
   - Wenner
   - Schlumberger



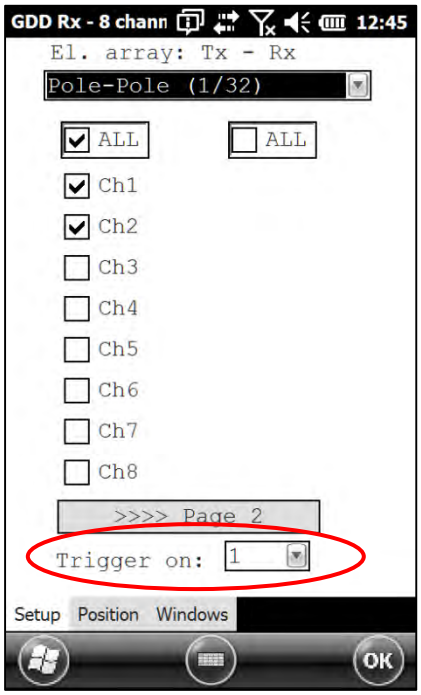




Dipole-Dipole (2/16), Dipole-Dipole (4/8), Pole-Dipole (2/16), Pole-Dipole (4/8) and other modes (2/16) or (4/8) are used with a 16 or 32 channels receiver only.

3. Check the active channel(s). Tap on the checkbox to select all channels or tap on the checkbox to unselect all channels.



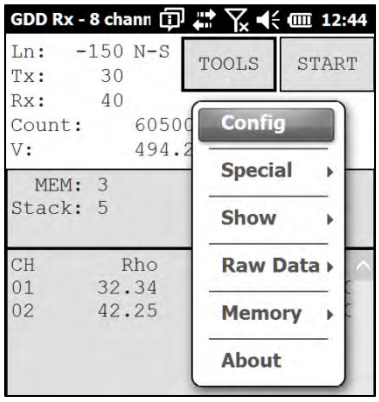

4. Select the trigger channel, this channel is used for the synchronization process.

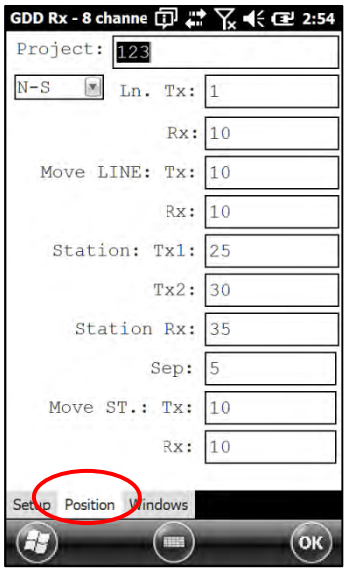


### 7.1.2 Position

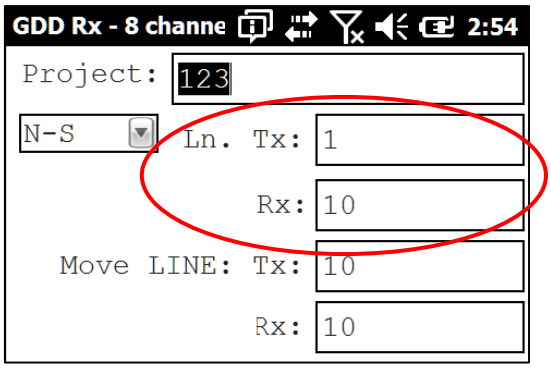
The POSITION tab is used to set these parameters: the Tx line number, the Rx line number, the line direction, the transmitter position (Tx1 and Tx2), the receiver position, the separation, the transmitter movement offset and receiver movement offset.

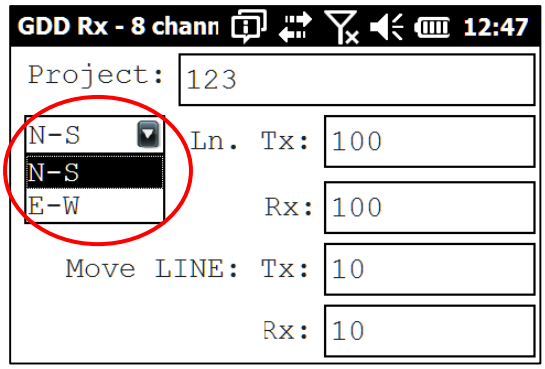
1. Select Tools | Config | Position



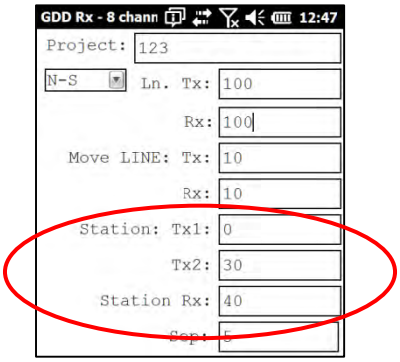

2. Enter line number and select line direction. Use the keyboard at the bottom of the screen or use the numeric keypad of the Archer2 Field PC.



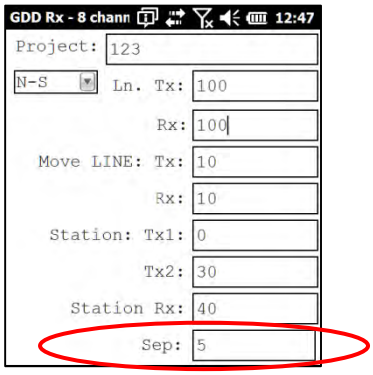

A negative number cannot be entered for line; the labels N, S, E and W are used to define direction.

3. Enter the transmitter and receiver first electrode position.



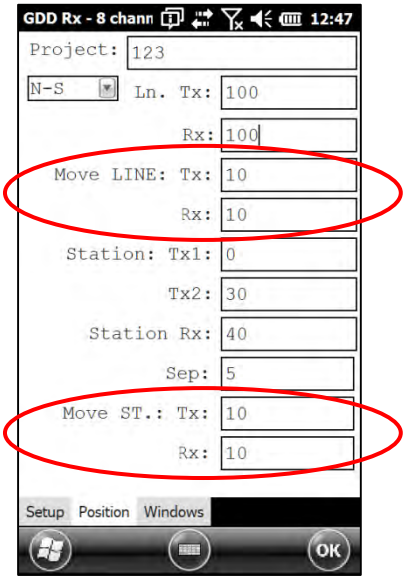

A negative number is used to define South and West direction.

4. Enter the separation between electrodes of the receiver.




A negative number is used to define South and West direction.

5. Enter the transmitter and receiver electrodes moving distance.

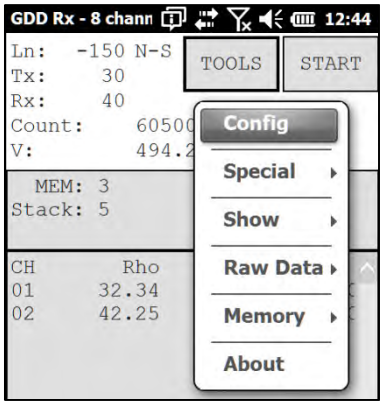


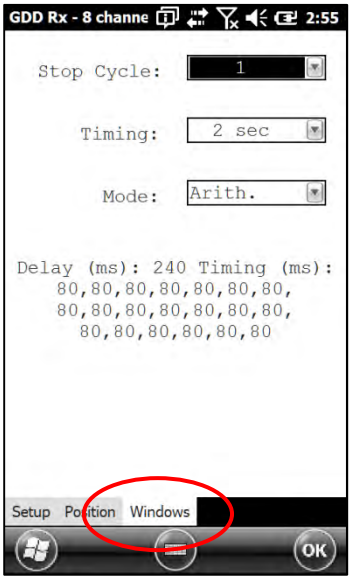

A negative number is used to define South or West direction.

### 7.1.3 Windows

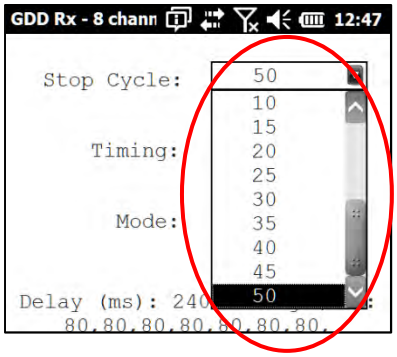
The WINDOWS option is used to set the signal timing and the mode.

1. Select Tools | Config | Windows

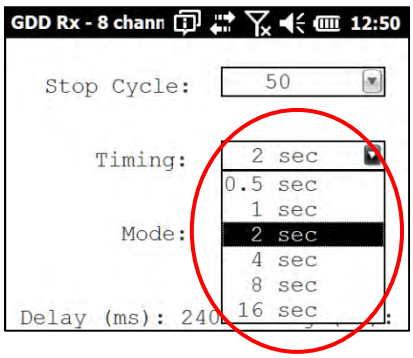


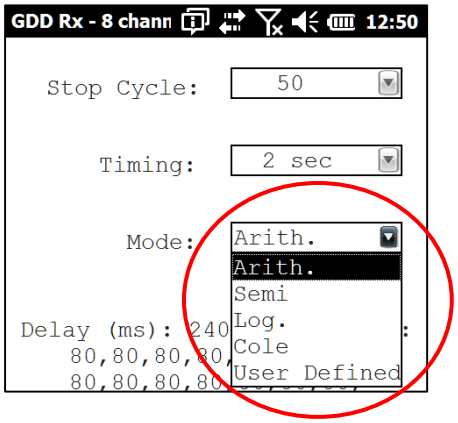

2. Select the maximum number of stacks.




3. Select the signal timing.



4. Select the mode (windows time definition).




- Arithmetic

  Windows: 20
  Delay (ms): 240
  Timin g (ms): 2000
  80, 80, 80, 80, 80, 80, 80, 80, 80, 80,
  80, 80, 80, 80, 80, 80, 80, 80, 80, 80

- Semi logarithmic

  Windows: 20
  Delay (ms): 40
  Timing (ms): 2000
  40, 40, 40, 40, 40, 40, 80, 80, 80, 80,
  80, 80, 80, 160, 160, 160, 160, 160, 160, 160

- Logarithmic

  Windows: 4
  Delay (ms): 160
  Timing (ms): 2000
  120, 220, 420, 820

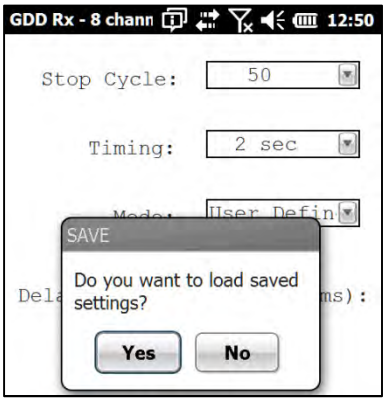
- Cole

  Windows: 20
  Delay (ms): 20
  Timing (ms): 2000
  20, 30, 30, 30, 40, 40, 50, 60, 70, 80,
  90, 100, 110, 120, 130, 140, 150, 160, 180, 200

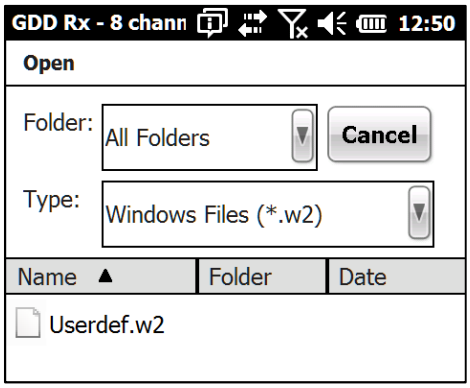
- User defined

  Windows: between 1 and 20
  Delay (ms): user defined
  Timing (ms): user defined

In the USER mode, you can load settings you have saved before, or you can create new settings.



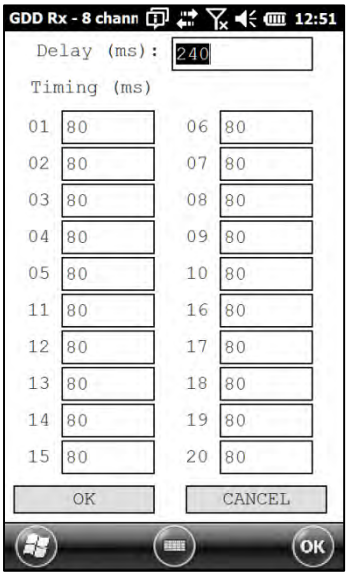

Click YES to load your settings from a previously saved file. This window will appear.




In this dialog box, select your file. The Windows window appears automatically. Click OK. The saved values will be loaded in the User defined mode.

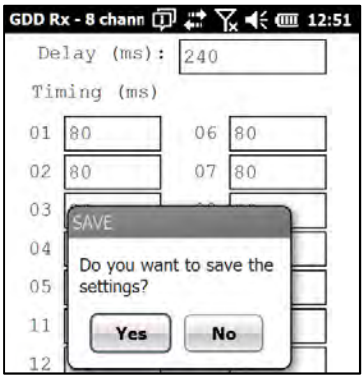
OR

Click NO to manually enter the delay and window(s) width.




Click OK when your settings are configured.

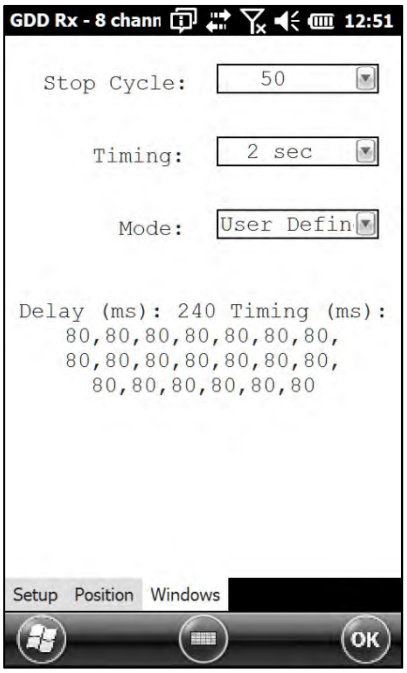
Click YES to save your new settings.



Enter your filename and the location where you want to save your file. The User defined settings will be saved so you can reload them in the Archer2 Field PC later.

Click NO if you do not want to save your User defined settings in a file.

In all cases, you will be brought back to this display and the settings you have entered in the User defined window will be loaded into the Archer2 Field PC.

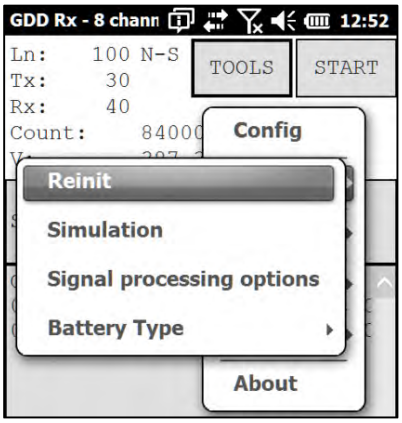


## 7.2 Special option

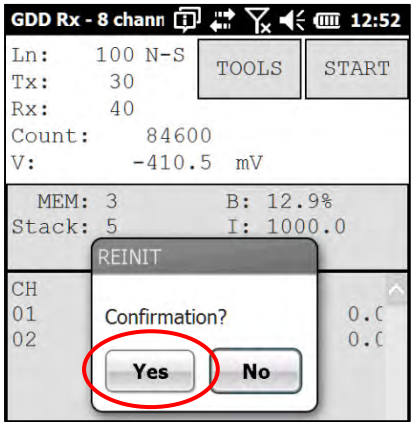
### 7.2.1 Reinit

The REINIT option is used to reset GRx2 communication with the Archer2 Field PC. This option is useful when the Bluetooth communication is lost.

1. Select Tools | Special | Reinit



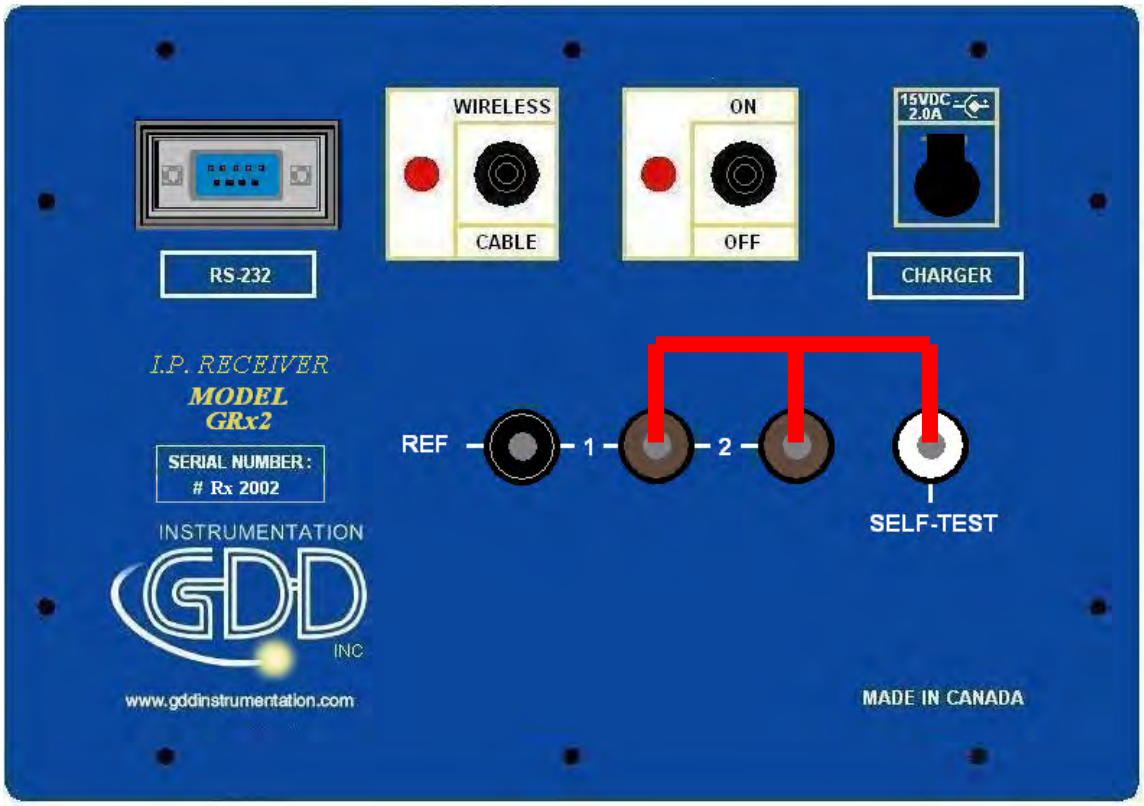

2. Click YES to reinitialize the GRx2.



### 7.2.2 Simulation

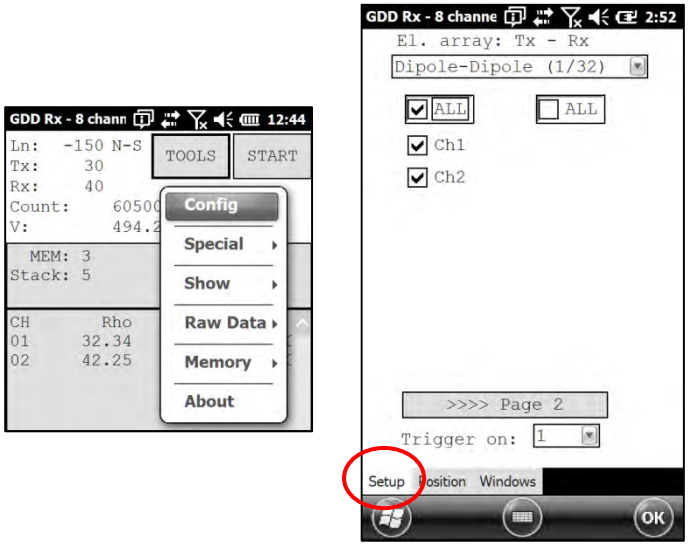
The SIMULATION option is used to perform a self test with the internal waveform generator (you need to select the Pole-Pole configuration to use this option).

1. Short the SELF-TEST terminal with the channel(s) you want to test. The picture below shows a self-test with the two channels.

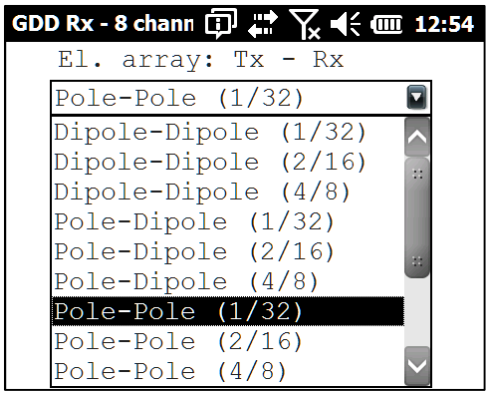


2. Turn ON the receiver.

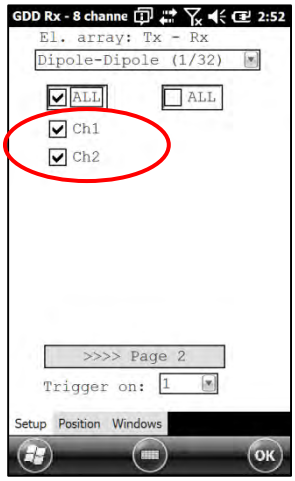
3. Select Tools | Config | Setup



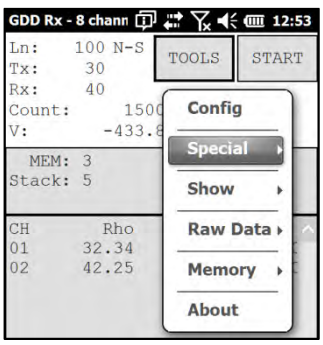

4. Select the Pole-Pole (1/32) array configuration.

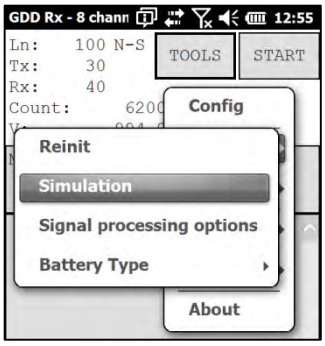


5. Check the channel(s) you want to test. Click Ok.

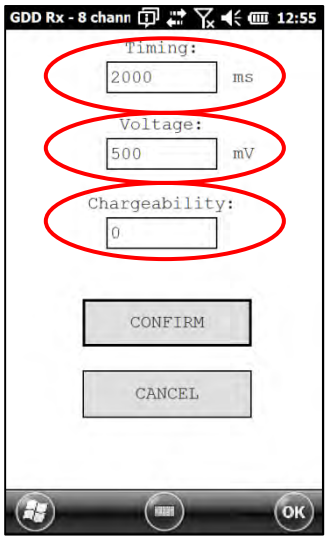



6. Select Tools | Special | Simulation

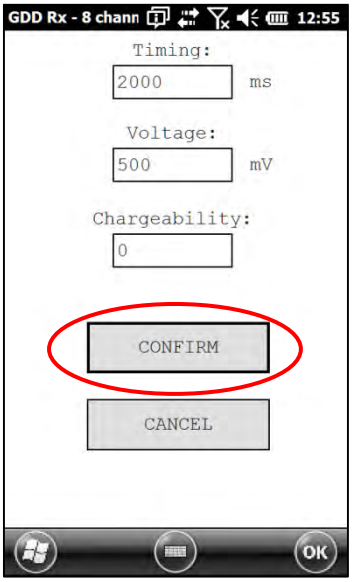


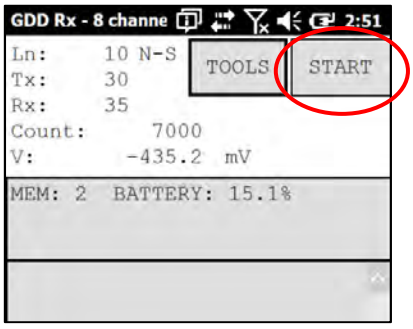

7. Enter the waveform timing (default = 2000ms).
8. Enter the primary voltage (default = 500mV).
9. Enter the chargeability (default = 0).



10. Click on CONFIRM. The output signal of the self-test electrode will be activated only once you have click on CONFIRM.




11. Click START to begin the acquisition process.

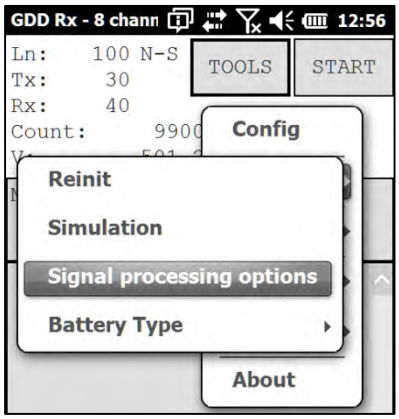



12. If you want to disable the self-test output signal, go to Simulation window and enter 0mV in the Voltage field.

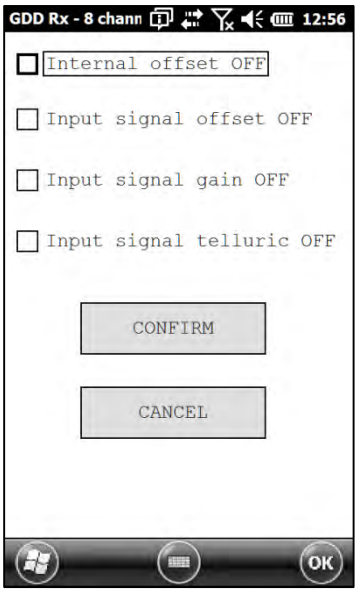
### 7.2.3 Signal Processing Options

The SIGNAL PROCESSING OPTIONS are used to disable the default gain and offset settings. When offset and gains are applied, the signal to noise ratio is improved.

1. Select TOOLS | Special | Signal Processing Options




2. Check the checkboxes of the settings you want to disable and click CONFIRM.




**Note that the gains and offsets are enabled (applied) every time you start the GDD Rx program again even if you disabled them the last time you used them.**

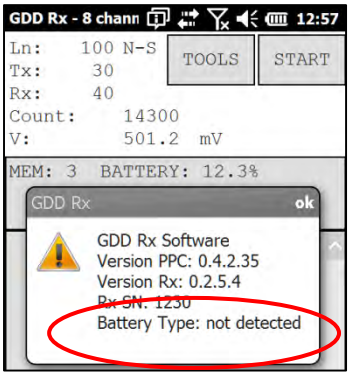
### 7.2.4 Battery type

With GRx8-32 firmware version 2.5.5 or higher, the GDD Rx program detects the type of batteries in the receiver automatically. It cannot be done with GRx2.

Select Tools | About

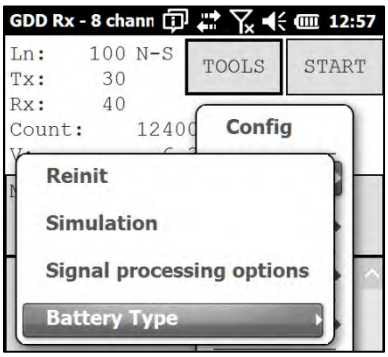
If a battery type is detected, the information will appear in the *About* pop-up window.

If the GDD Rx program cannot detect the battery type (GRx8-32 firmware 2.5.4 or earlier, or GRx2 receiver), the *About* pop-up window will indicate *Battery Type: not detected*.

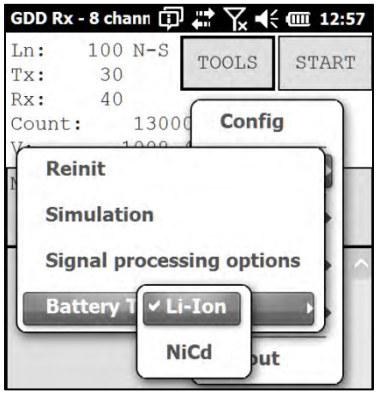



In which case, it is possible to select the battery type manually.

Select Tools | Special | Battery Type



Select the type of batteries in your receiver. **All GRx2 receivers have Li-Ion batteries.**

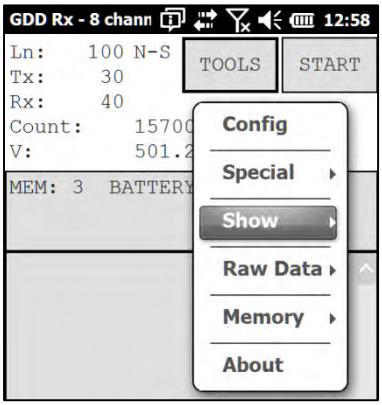


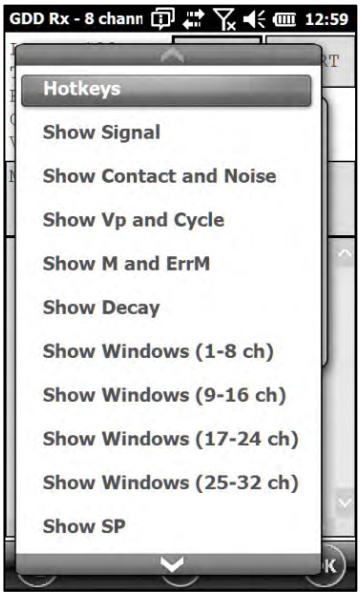

If you select the wrong battery type, the battery level indicated in the main window of the GDD Rx program will be slightly different from the actual value.

## 7.3 Hotkeys

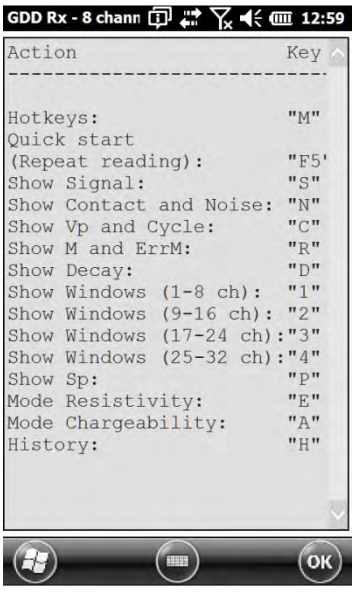
The HOTKEYS option is used to display the shortcut keys menu. **This option is available with the Allegro Field PC only.**

1. Select Tools | Show | Hotkeys




2. The following screen appears.



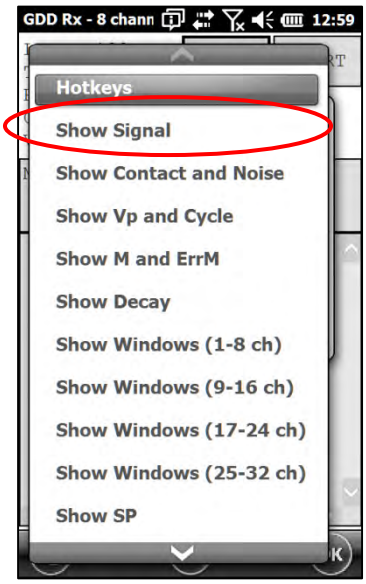

Use the shortcut keys to navigate quickly between the different options.

## 7.4 Show option

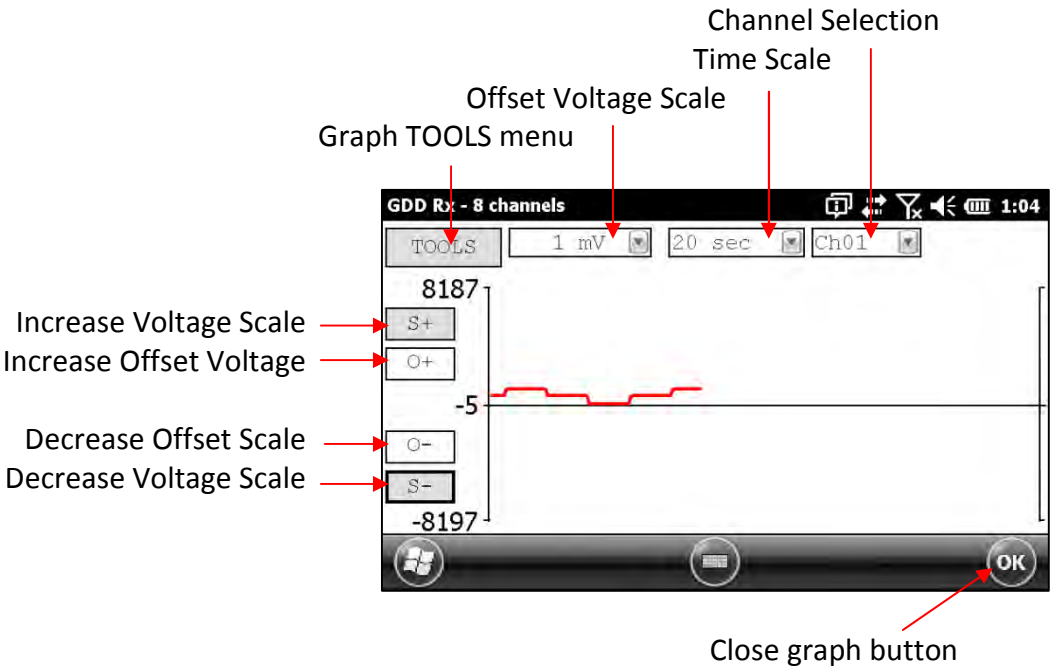
### 7.4.1 Signal

The SIGNAL option is used to display the signal graph of a selected channel.

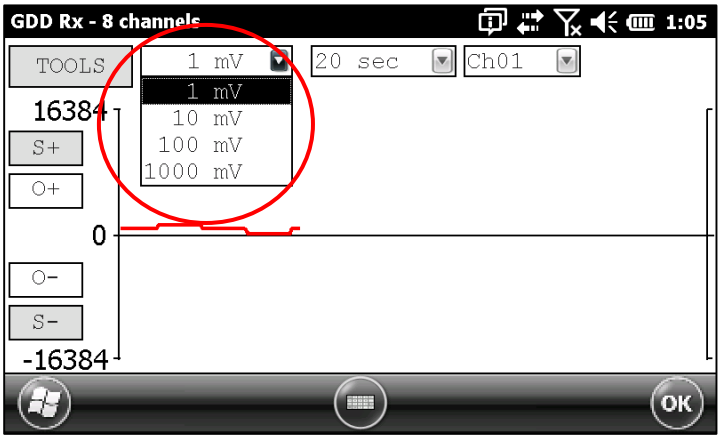
1. Select Tools | Show | Show Signal



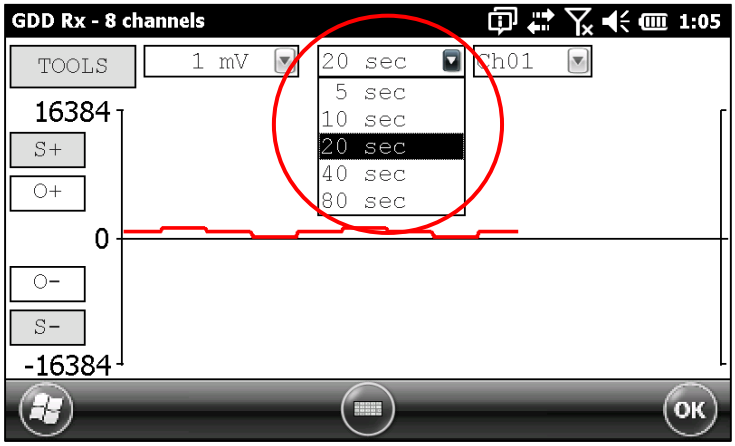

2. The following screen appears.



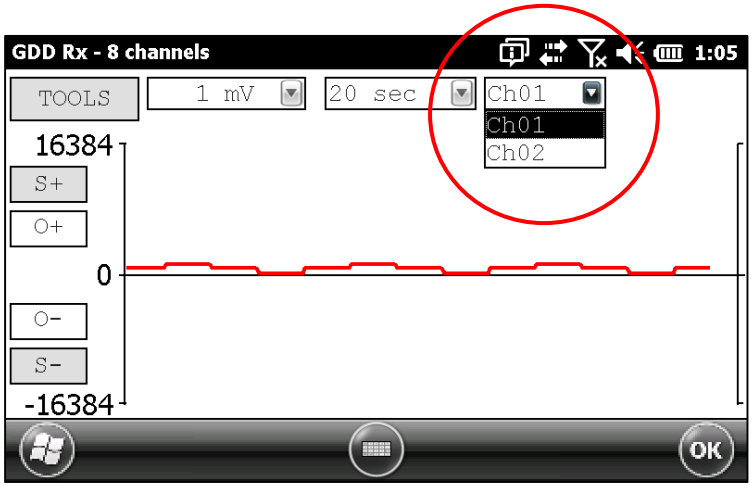
3. Select offset voltage scale.




4. Select time scale.




5. Select display channel

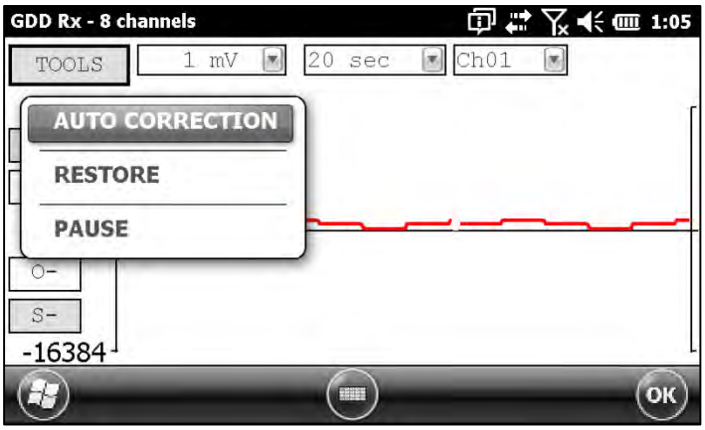


### *7.4.1.1 Tools menu*

#### 7.4.1.1.1 Auto Correction

The AUTO CORRECTION option is used to optimize the graph scale and correct the offset of the signal. This option should be used after one signal period (8 sec for a 2 sec time base).

1. Select Tools | Auto Correction




#### 7.4.1.1.2 Restore

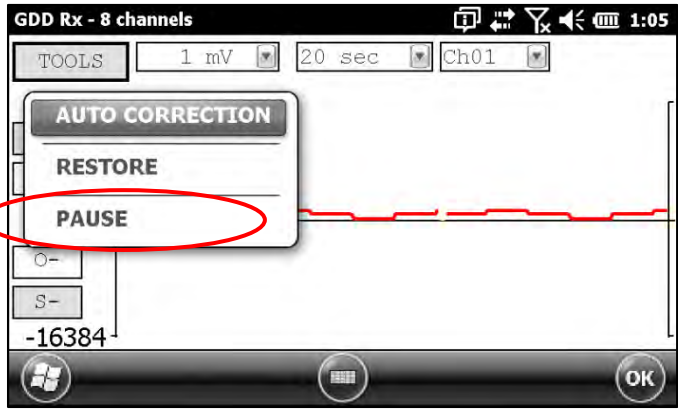
The RESTORE option is used to reset the settings to default.

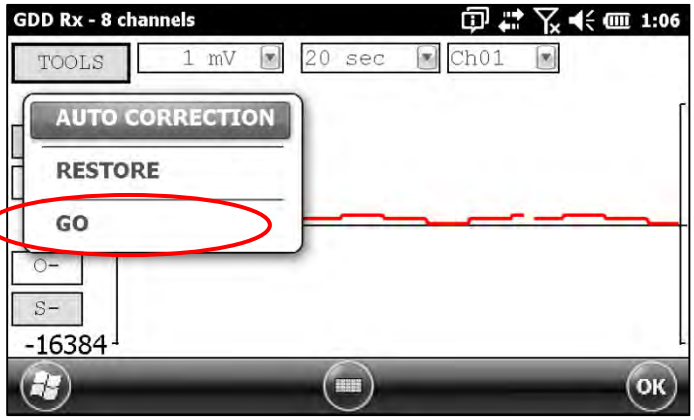
1. Select Tools | Restore

#### 7.4.1.1.3 PAUSE/GO

The PAUSE/GO option is used to pause or play the signal.

1. Select Tools | Pause or Tools | Go



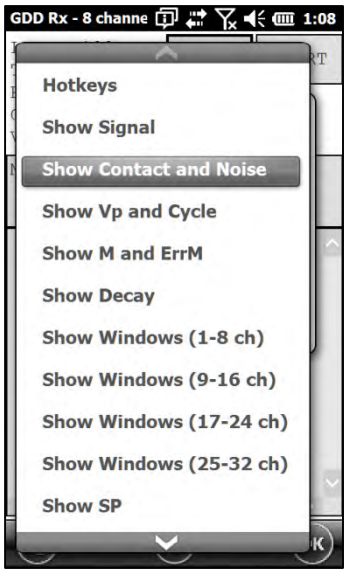



### 7.4.2 Contact and Noise

The CONTACT AND NOISE option is used to display the noise graph of all channels. This option can be useful for troubleshooting if you have noise problem. The Contact graph shows the contact resistance between your electrodes and the ground.

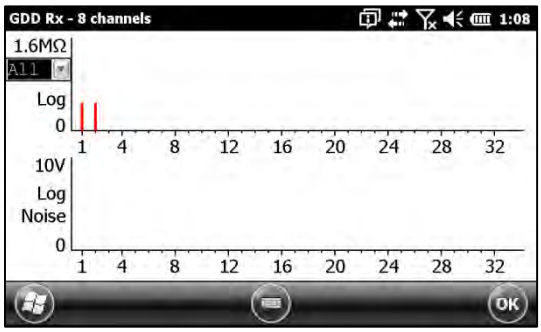
*This option should be used before your transmitter sends current. If the transmitter sends current, the Vp signal will be displayed for each active channel.

1. Select Tools | Show | Show Noise

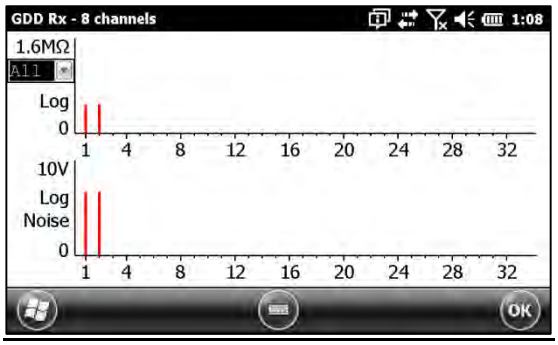



2. The following screen appears.

Transmitter is ***not*** sending current




Transmitter is sending current

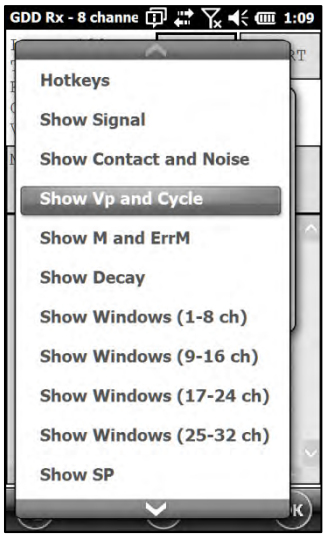


### 7.4.3 Vp and Cycle

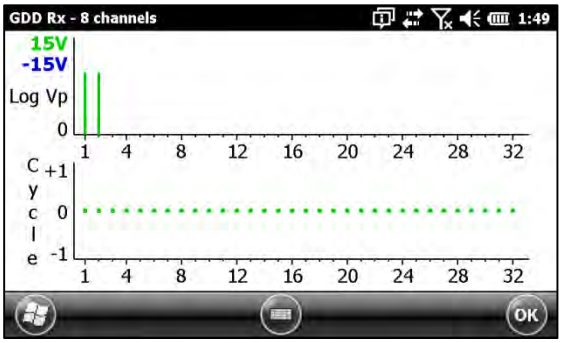
Steps 14 to 16 of Section 5 of this Manual must be done before using this feature.

The VP AND CYCLE option is used to show the channel synchronization. This option can be useful for troubleshooting if you have connection problem. The VP part of the graph shows the primary voltage of all your electrodes. The current graph is an example; your VP graph will depend on the physical configuration of the electrodes.

1. Select Tools | Show | Show Cycle




2. The following screen appears.



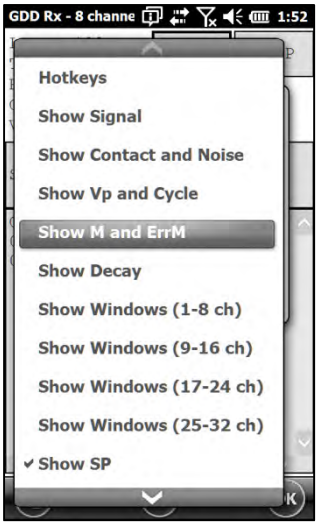

- Green line indicates that this Vp is positive.
- Blue line indicates that this Vp is negative.
- Red dots indicate that the GRx2 is not synchronized.
- Green dots indicate that the GRx2 is synchronized.
- If the GRx2 is synchronized and the green dots are not moving in the same direction, check the electrodes position on the GRx2 front panel.

### 7.4.4 Show M and errM

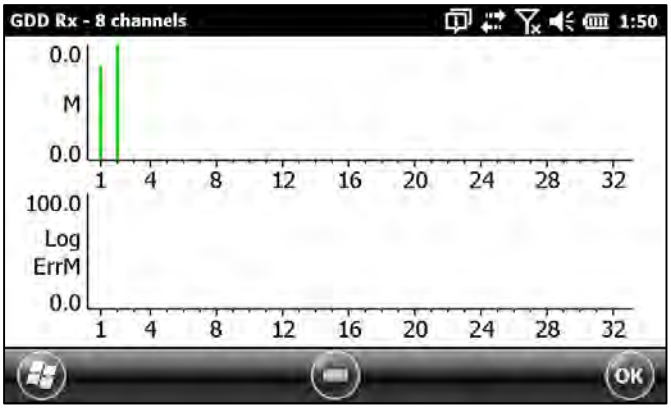
Steps 14 to 16 of Section 5 of this Manual must be done before using this feature.

The Show M and errM option is used to display the chargeability and the error in chargeability for each channel.

1. Select Tools | Show | M and errM




2. The following screen appears.

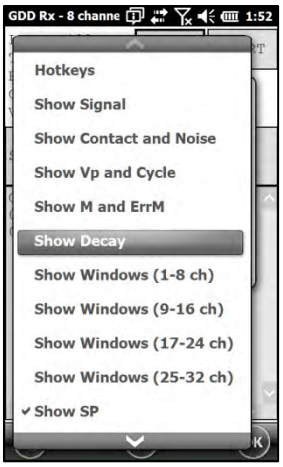


### 7.4.5 Decay Curve

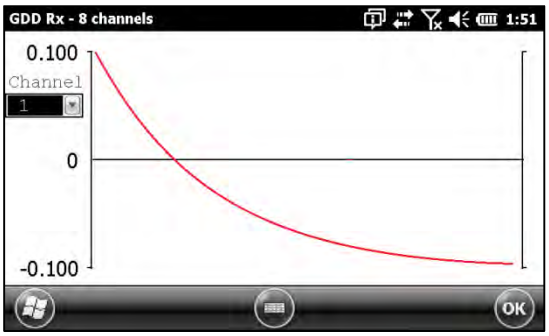
Steps 14 to 16 of Section 5 of this Manual must be done before using this feature.

The *Decay Curve* option is used to display the decay graph of a selected channel.

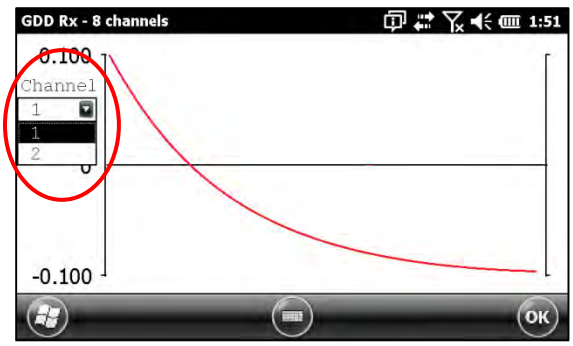
1. Select Tools | Show | Show Decay




2. The following screen appears.




3. Select the displayed channel.

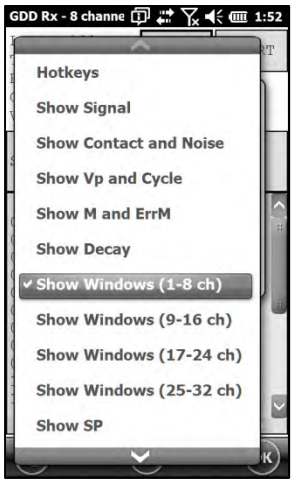


### 7.4.6 Show Windows

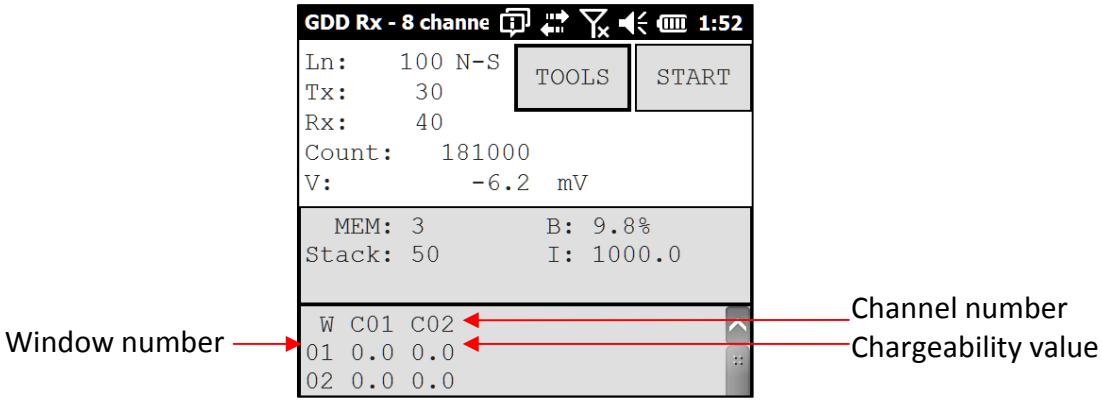
Steps 14 to 16 of Section 5 of this Manual must be done before using this feature.

The *Show Windows* option is used to display the windows chargeability of each channel.

1. Select Tools | Show | Show Windows (1-8 ch)




2. The following screen appears.

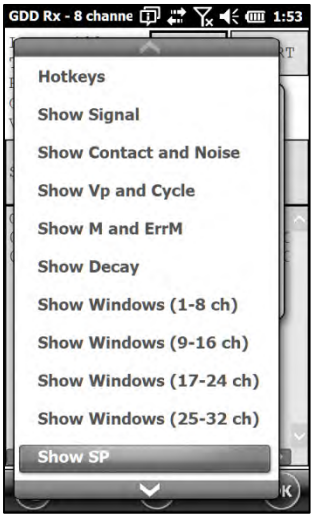


### 7.4.7 Show Sp

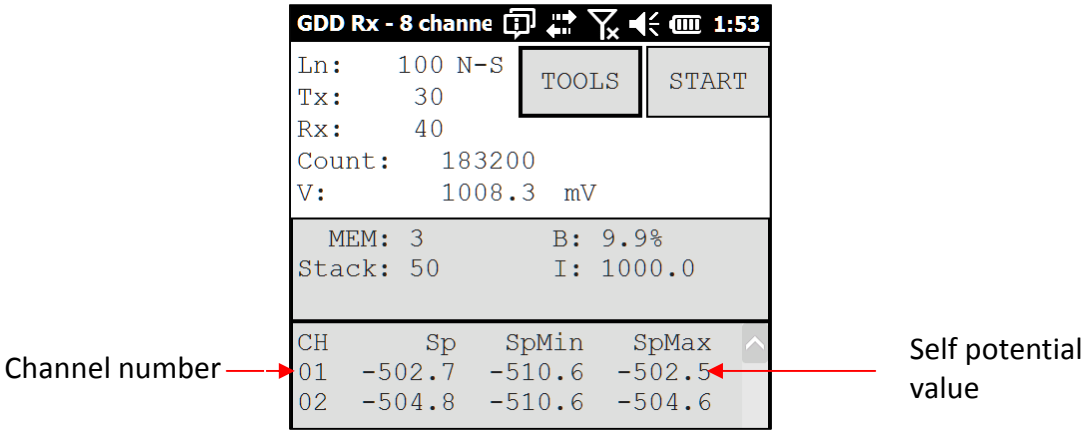
Steps 14 to 16 of Section 5 of this Manual must be done before using this feature.

The SHOW SP option is used to display the self potential (SP) in mV of each channel.

3. Select Tools | Show | Show SP




4. The following screen appears.



## 7.5 Raw Data option

### 7.5.1 Check GPS

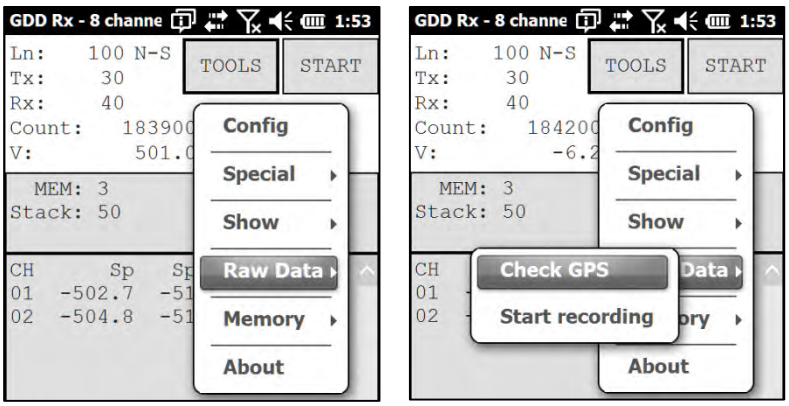
To use the GPS function, your receiver must be equipped with an internal GPS module. This GPS module is designed for use with applications that require accurate time.

The *Check GPS* option is used to verify if a satellite is being tracked by the GPS module.

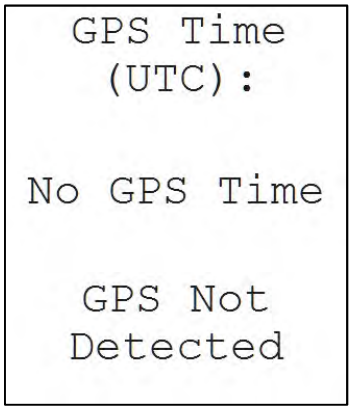
Connect an external antenna (SMA) to the GPS connector of the GRx2 receiver for more efficiency.

After turning on the GRx2 receiver, it can take up to 2 or 3 minutes for the GPS receiver to track and synchronize with a satellite.

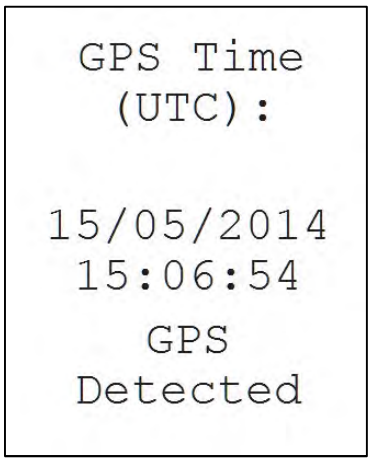
Select Tools | Raw Data | Check GPS



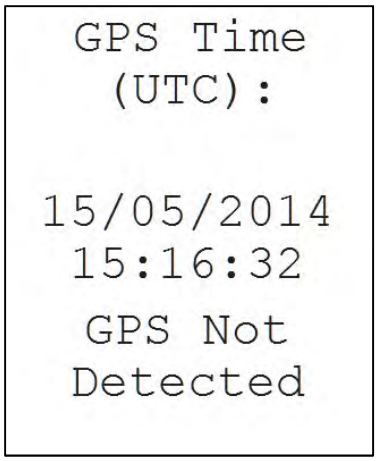
If the GPS module is not synchronized with a satellite, the following window will appear.




Once the GPS module is synchronized with a satellite, the following window should appear.



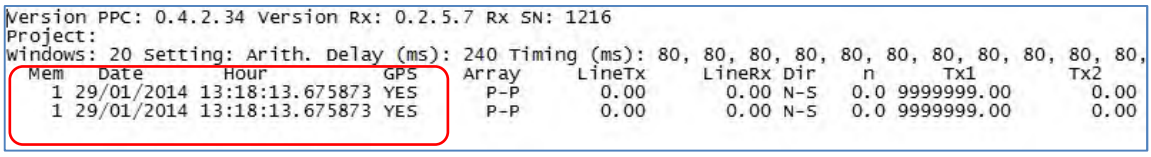

If the GPS signal is lost, the time synchronization will be kept for 30 minutes. In that case, the following window should appear :



This window allows you to verify if the GPS works properly. You can close this window and continue to work normally with your GRx8-32 receiver. You can occasionally verify if the GPS is still tracking the satellite.

The GPS timestamps will appear in the *.gps* file (see Section 7.6.5 to to create a *.gps* file). The data in this file is the same than that of the *.gdd* file except for the GPS timestamp (the time in the *.gdd* file comes from the PDA).

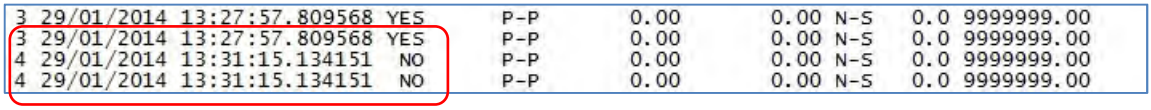
Example of a *.gps* file



```
Version PPC: 0.4.2.34 Version Rx: 0.2.5.7 Rx SN: 1216
Project:
Windows: 20 Setting: Arith. Delay (ms): 240 Timing (ms): 80, 80, 80, 80, 80, 80, 80, 80, 80, 80,
 Mem   Date        Hour          GPS   Array    LineTx     LineRx Dir    n       Tx1         Tx2
   1 29/01/2014 13:18:13.675873 YES     P-P       0.00       0.00 N-S   0.0 9999999.00      0.00
   1 29/01/2014 13:18:13.675873 YES     P-P       0.00       0.00 N-S   0.0 9999999.00      0.00
```

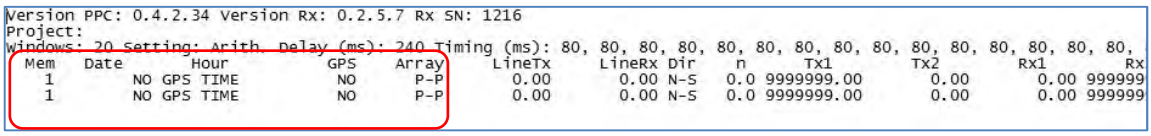
If there is a GPS synchronization, the column GPS will show YES as shown on the picture above.

If the GPS signal is lost, the synchronization will be kept for 30 minutes. In that case, the Date and Hour will continue to increase following the GPS time but the GPS column will show NO as shown on the picture below.



```
3 29/01/2014 13:27:57.809568 YES     P-P       0.00       0.00 N-S   0.0 9999999.00
3 29/01/2014 13:27:57.809568 YES     P-P       0.00       0.00 N-S   0.0 9999999.00
4 29/01/2014 13:31:15.134151  NO     P-P       0.00       0.00 N-S   0.0 9999999.00
4 29/01/2014 13:31:15.134151  NO     P-P       0.00       0.00 N-S   0.0 9999999.00
```

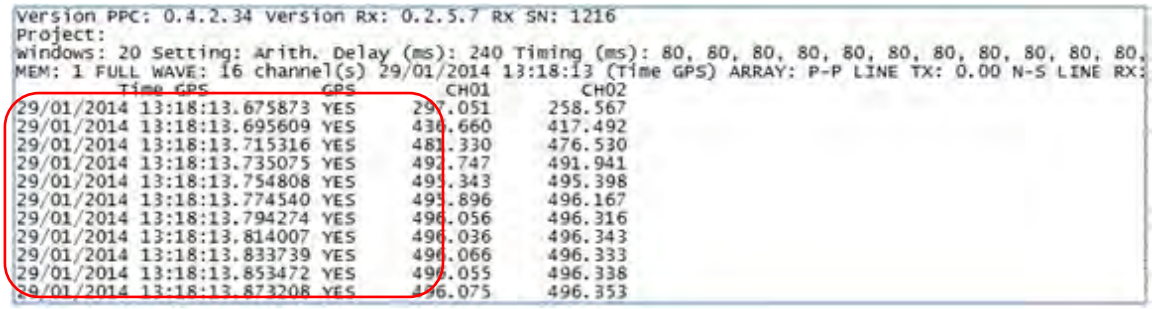
If there is no GPS synchronization or if the GPS signal has been lost for more than 30 minutes, the Date and Hour will be replaced by *NO GPS TIME*.



```
Version PPC: 0.4.2.34 Version Rx: 0.2.5.7 Rx SN: 1216
Project:
Windows: 20 Setting: Arith. Delay (ms): 240 Timing (ms): 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80,
 Mem   Date        Hour          GPS   Array    LineTx     LineRx Dir    n       Tx1         Tx2         Rx1          Rx
   1        NO GPS TIME          NO     P-P       0.00       0.00 N-S   0.0 9999999.00      0.00        0.00 999999
   1        NO GPS TIME          NO     P-P       0.00       0.00 N-S   0.0 9999999.00      0.00        0.00 999999
```

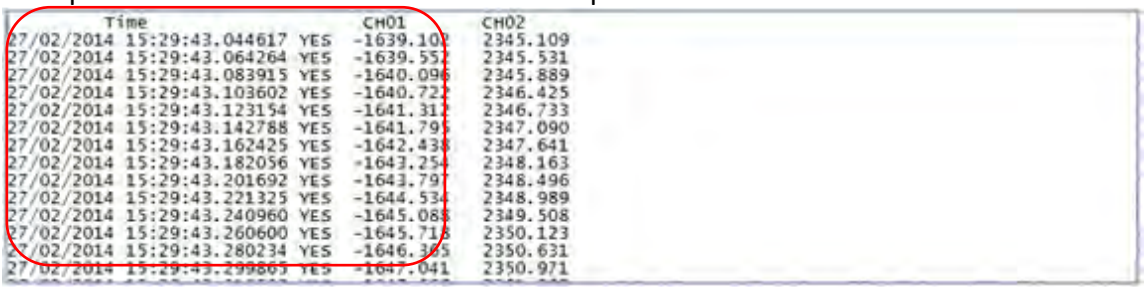
The GPS timestamps will also appear in the fullwave file (see Section 7.6.5 to create a fullwave file) or in the raw data file (see Section 7.5.2 to use raw data option).

Example of a fullwave file with GPS timestamps



```
Version PPC: 0.4.2.34 Version Rx: 0.2.5.7 Rx SN: 1216
Project:
Windows: 20 Setting: Arith. Delay (ms): 240 Timing (ms): 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80,
MEM: 1 FULL WAVE: 16 channel(s) 29/01/2014 13:18:13 (Time GPS) ARRAY: P-P LINE TX: 0.00 N-S LINE RX:
          Time GPS              GPS        CH01        CH02
29/01/2014 13:18:13.675873 YES      297.051     258.567
29/01/2014 13:18:13.695609 YES      436.660     417.492
29/01/2014 13:18:13.715316 YES      481.330     476.530
29/01/2014 13:18:13.735075 YES      492.747     491.941
29/01/2014 13:18:13.754808 YES      495.343     495.398
29/01/2014 13:18:13.774540 YES      495.896     496.167
29/01/2014 13:18:13.794274 YES      496.056     496.316
29/01/2014 13:18:13.814007 YES      496.036     496.343
29/01/2014 13:18:13.833739 YES      496.066     496.333
29/01/2014 13:18:13.853472 YES      496.055     496.338
29/01/2014 13:18:13.873208 YES      496.075     496.353
```

Example of a raw data file with GPS timestamps



```
          Time                        CH01        CH02
27/02/2014 15:29:43.044617 YES  -1639.102     2345.109
27/02/2014 15:29:43.064264 YES  -1639.552     2345.531
27/02/2014 15:29:43.083915 YES  -1640.096     2345.889
27/02/2014 15:29:43.103602 YES  -1640.722     2346.425
27/02/2014 15:29:43.123154 YES  -1641.312     2346.733
27/02/2014 15:29:43.142788 YES  -1641.795     2347.090
27/02/2014 15:29:43.162425 YES  -1642.438     2347.641
27/02/2014 15:29:43.182056 YES  -1643.254     2348.163
27/02/2014 15:29:43.201692 YES  -1643.797     2348.496
27/02/2014 15:29:43.221325 YES  -1644.534     2348.989
27/02/2014 15:29:43.240960 YES  -1645.088     2349.508
27/02/2014 15:29:43.260600 YES  -1645.718     2350.123
27/02/2014 15:29:43.280234 YES  -1646.365     2350.631
27/02/2014 15:29:43.299865 YES  -1647.041     2350.971
```

As for the *.gps* file, if there is no GPS synchronization or if the GPS signal has been lost for more than 30 minutes, the *Date* and *Hour* will be replaced by *NO GPS TIME* in the *.fullwave* and *.rdf* files.

Take note that for some reasons, such as weak signal areas, the GPS module will not be able to track and synchronize with a satellite.

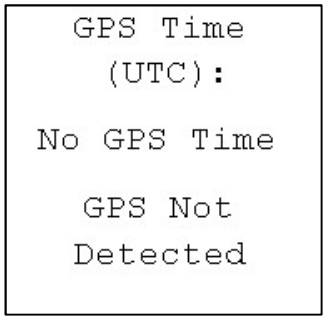
### 7.5.2 Start Recording (raw data)

This option is used to record raw data without any synchronization with a transmitter signal. This can be useful to record the telluric or noise from the ground.

The receiver will record a reading every 20 ms. Thanks to the GPS module, each recorded reading will be accurately time stamped. Your receiver must be equipped with an internal GPS module to use GPS with the raw data function.

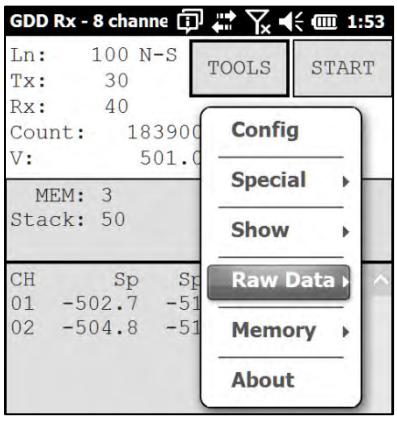
1. Make sure that channel 1 is connected to the ground.

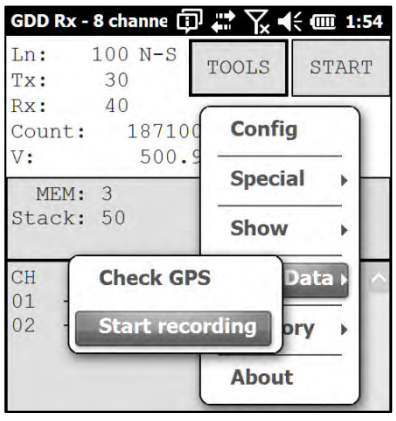
2. If you want to verify the GPS time, select Tools | Raw Data |Check GPS (see Section 7.5.1 for more details).



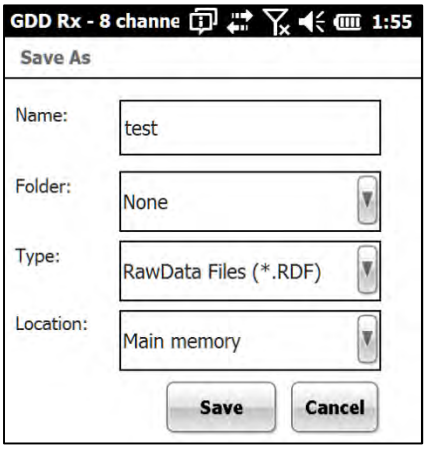
If you see No GPS Time, either the internal GPS module cannot receive any data from a satellite, or your receiver does not have this option.

3. To begin the data acquisition, select Tools | Raw Data | Start recording.

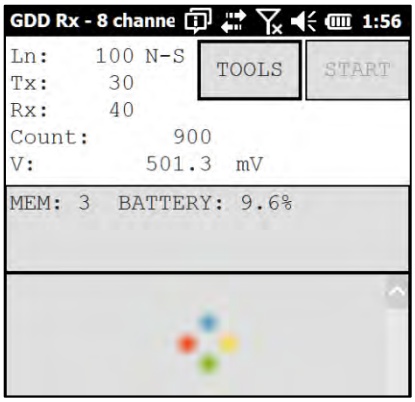


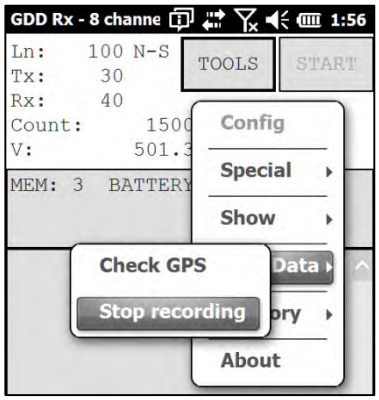



4. You will be prompted to name your file.




5. The following icon will appear and data will be recorded until you stop the acquisition by selecting Tools | Raw data | Stop recording.




The extension of the file created with your raw data is '.rdf'.

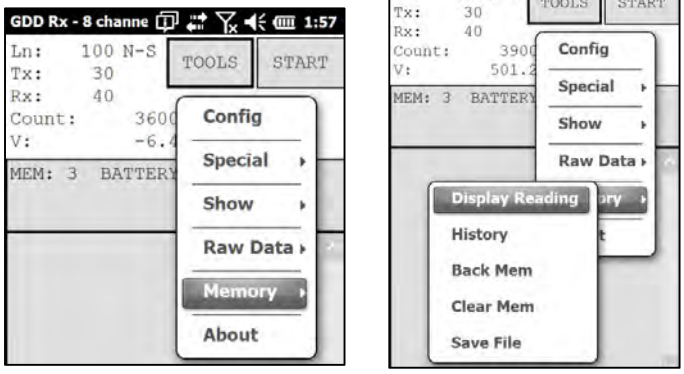
Example of a raw data file with GPS timestamps

| Time | | CH01 | CH02 |
|---|---|---|---|
| 27/02/2014 15:29:43.044617 | YES | -1639.102 | 2345.109 |
| 27/02/2014 15:29:43.064264 | YES | -1639.552 | 2345.531 |
| 27/02/2014 15:29:43.083915 | YES | -1640.096 | 2345.889 |
| 27/02/2014 15:29:43.103602 | YES | -1640.722 | 2346.425 |
| 27/02/2014 15:29:43.123154 | YES | -1641.312 | 2346.733 |
| 27/02/2014 15:29:43.142788 | YES | -1641.795 | 2347.090 |
| 27/02/2014 15:29:43.162425 | YES | -1642.438 | 2347.641 |
| 27/02/2014 15:29:43.182056 | YES | -1643.254 | 2348.163 |
| 27/02/2014 15:29:43.201692 | YES | -1643.797 | 2348.496 |
| 27/02/2014 15:29:43.221325 | YES | -1644.534 | 2348.989 |
| 27/02/2014 15:29:43.240960 | YES | -1645.088 | 2349.508 |
| 27/02/2014 15:29:43.260600 | YES | -1645.718 | 2350.123 |
| 27/02/2014 15:29:43.280234 | YES | -1646.365 | 2350.631 |
| 27/02/2014 15:29:43.299865 | YES | -1647.041 | 2350.971 |

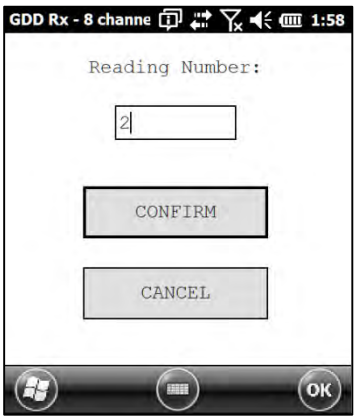
## 7.6 Memory option

### 7.6.1 Display Reading

The Display Reading option displays a particular reading on the PDA as the operator would see it in the field even if no receiver is connected to the PDA.

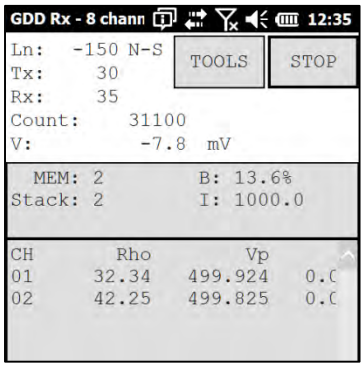



The following window will appear. The number in the *Reading Number:* field is always the Memory number of the latest reading taken. Enter the number of the reading you want to see. Click on CONFIRM.

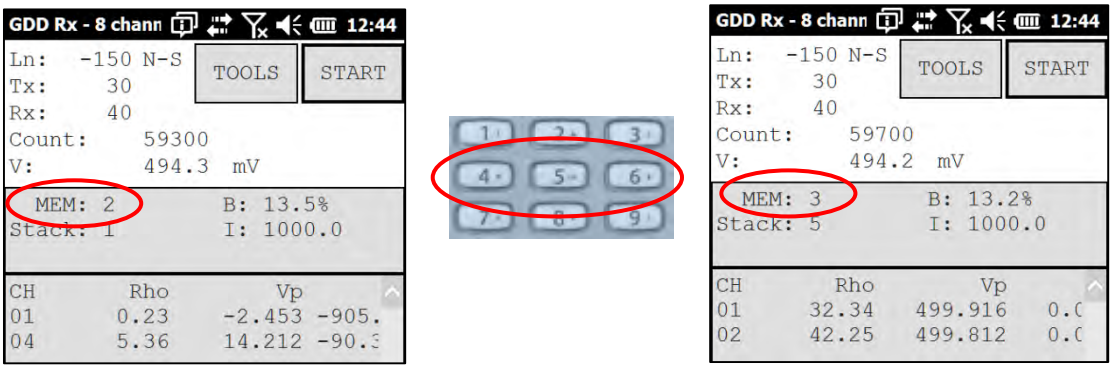


Select the chargeability windows you want to see and click CONFIRM.

The selected readings appear.



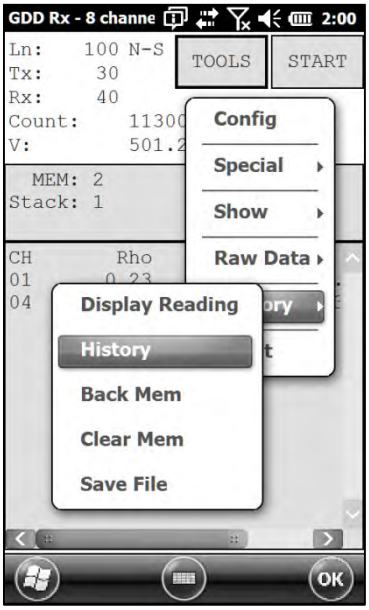

**Use Left and Right arrow buttons (shift ⇧ + 4◀ or 6▶) to compare your current data with that of your previous acquisitions. Use the Up and Down arrows to see all the channels.**

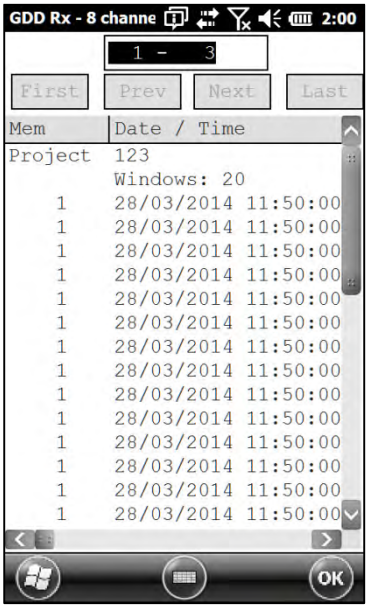



Keep in mind that there is no indication of which reading is monitored on the PDA display. At this point, it is possible to use the show menu to display some graphics or values of the channels.

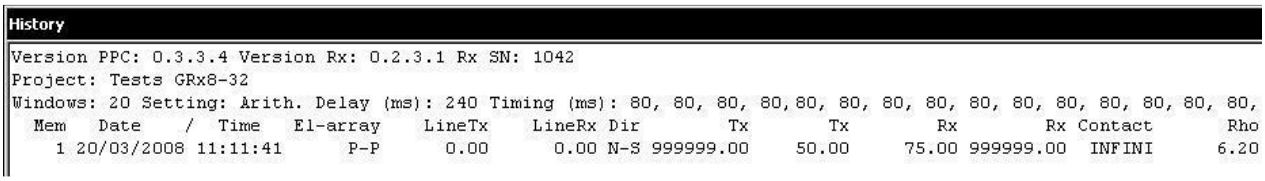
### 7.6.2 History

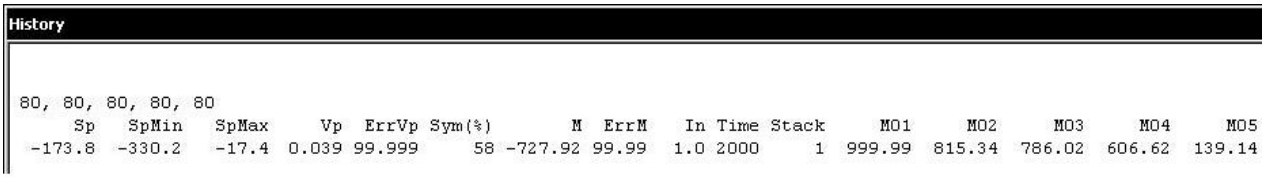
The History option is used to display all the data accumulated in the memory.

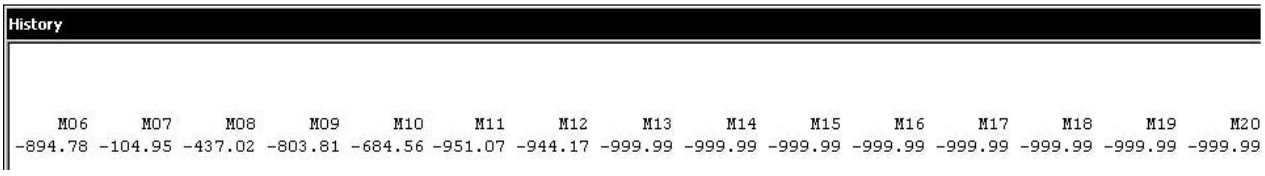



You will have to use the scroll bar to see all the information available. Click Next to go to the next page. The three following slides show all the information displayed by the history.


History
Version PPC: 0.3.3.4 Version Rx: 0.2.3.1 Rx SN: 1042
Project: Tests GRx8-32
Windows: 20 Setting: Arith. Delay (ms): 240 Timing (ms): 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80,
Mem Date / Time El-array LineTx LineRx Dir Tx Tx Rx Rx Contact Rho
1 20/03/2008 11:11:41 P-P 0.00 0.00 N-S 999999.00 50.00 75.00 999999.00 INFINI 6.20

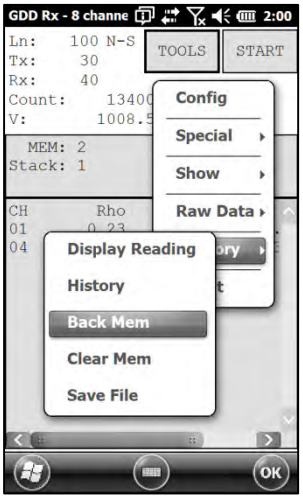


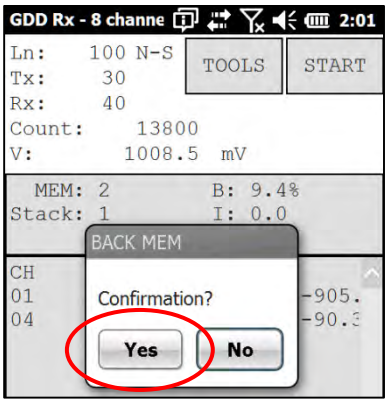
### 7.6.3 Back Mem

The *Back Mem* option is used to clear the last readings of the memory one by one.

1. Select Tools | Memory | Back Mem



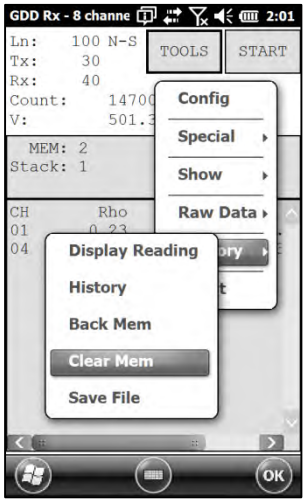

2. Click Yes to clear the last readings.



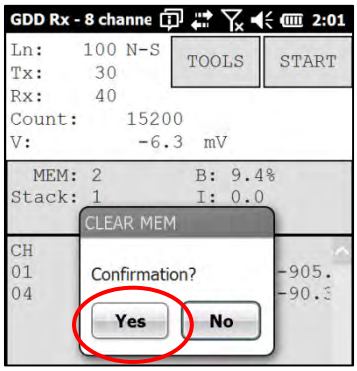
### 7.6.4 Clear Mem

The *Clear Mem* option is used to clear all the readings of the memory.

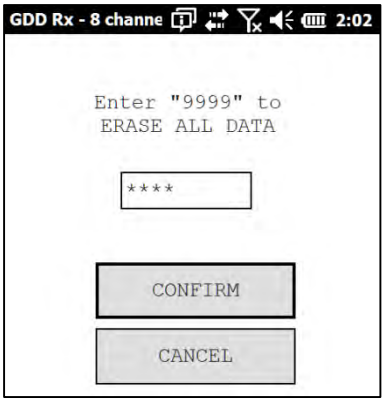
1. Select Tools | Memory | Clear Mem



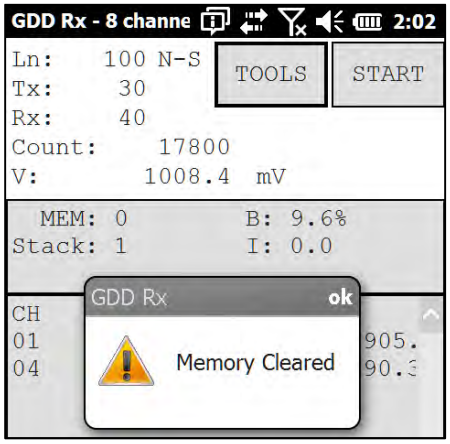

2. Click Yes to confirm the operation.




3. Enter 9999 in the text box and click CONFIRM to clear all the readings of the memory.



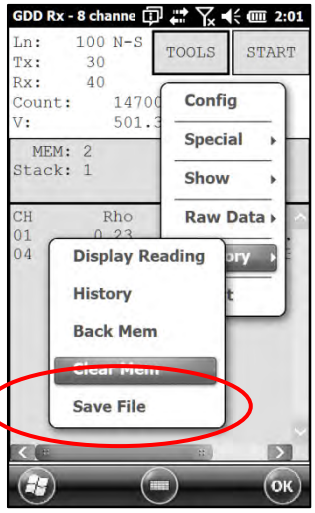
4. A message will follow to confirm your operation.



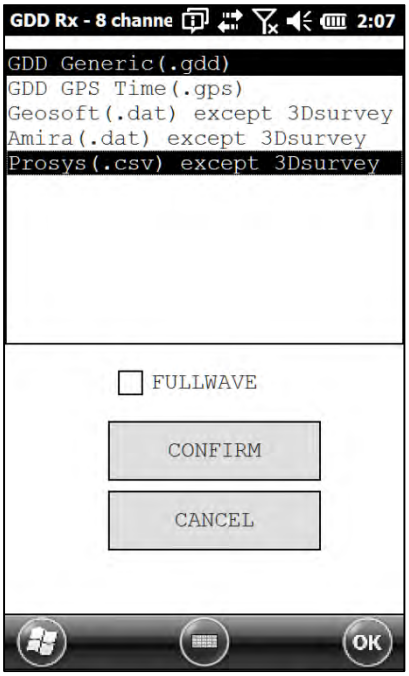
### 7.6.5 Save File

The *Save File* option is used to save the readings into a file.

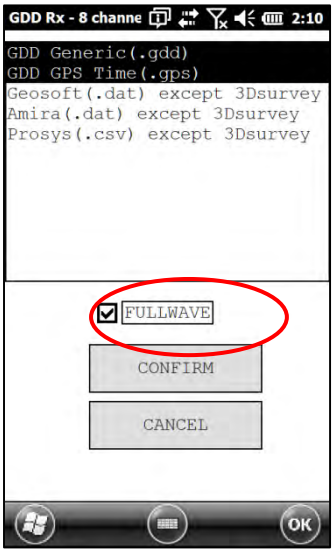
1. Select Tools | Memory | Save File



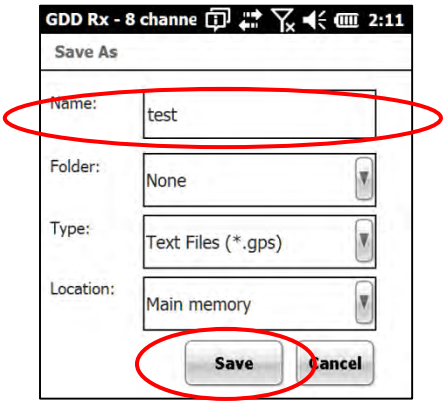

2. Select the output file format available according to your electrode configuration (only one output file format could be available). A GDD Generic file is always created even if you choose another format.



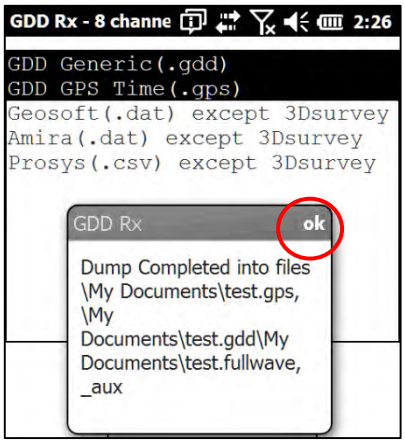
3. Select *FULLWAVE* if you want to create the fullwave file and click CONFIRM.




4. Enter the file name and click Save (the saving operation can take several minutes).



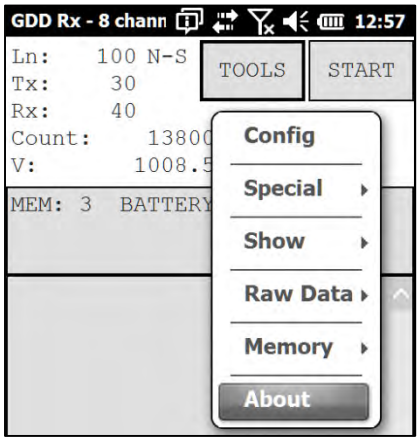

5. The following screen appears; click **OK** to close the pop up dialog box.



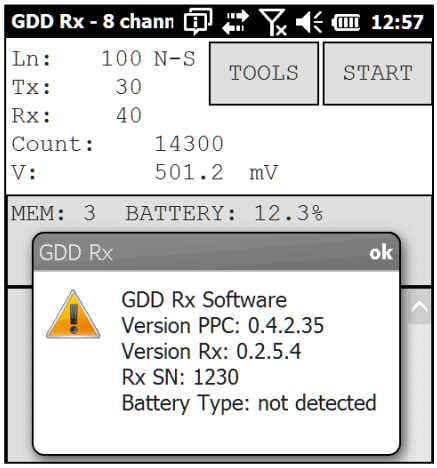
## 7.7 About option

The *About* option is used to display the software version number.

1. Select Tools | About




2. The following screen appears.




*See Section 7.2.4 for more information about *Battery Type*.

# 8 Transferring data

**In order to establish communication between the Archer2 Field PC and a desktop PC, you need to install the appropriate synchronisation software.**

Windows 7 or Vista 64 bits users will require Windows Mobile 64 bits while Windows 7 or Vista 32 bits users will need to install Windows Mobile 32 bits.

Install ActiveSync if you run Windows XP or earlier.

All three software are available on the CD supplied by GDD.

### *8.1 ActiveSync installation and settings*

1. Once ActiveSync is installed, a gray icon will appear in the bottom right corner of your desktop PC screen.

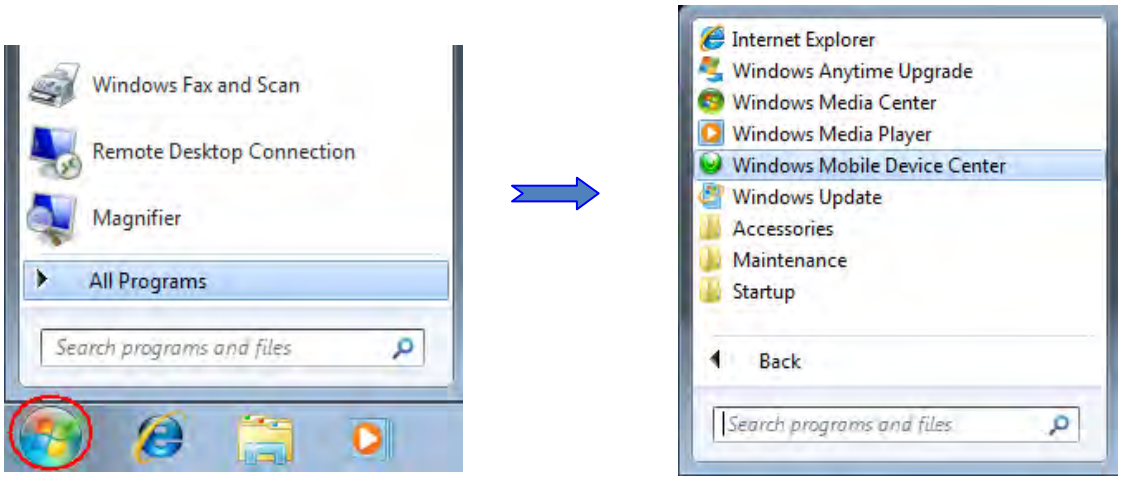
2. Right click on the *ActiveSync* icon to open the following menu and select *Connection Settings...*

3. Check *Allow USB connection with this desktop computer*.

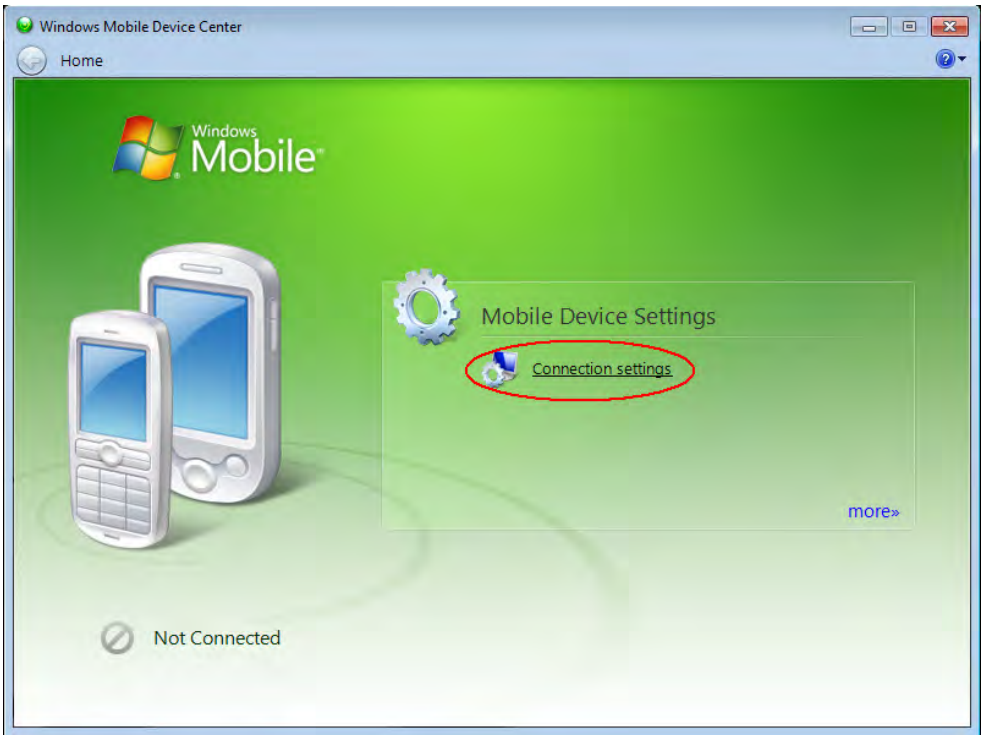
Connection Settings
Click Get Connected to connect your mobile device to this computer.
Status: Waiting for device to connect
Get Connected...
Allow serial cable or infrared connection to this COM port:
COM7
Status: COM port is not available
Allow USB connection with this desktop computer.
Status: USB is available
Allow network (Ethernet) and Remote Access Service (RAS) server connection with this desktop computer.
Status: Network is available
Status icon
Show status icon in Taskbar.
OK
Cancel
Help

### *8.2 Windows Mobile Device Center installation and settings*

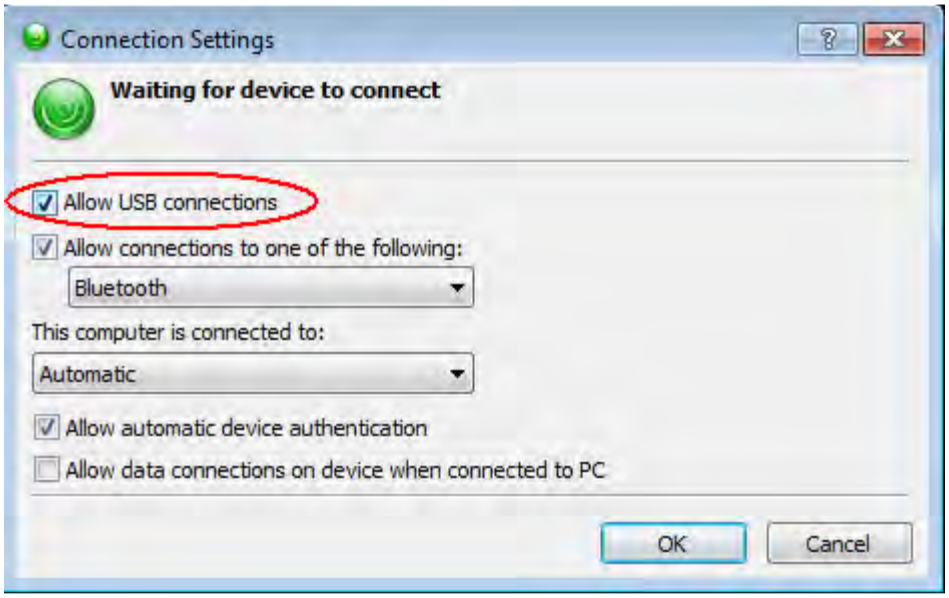
1. Once Windows Mobile Device Center 32 or 64 bits is installed, click the Windows Start Menu icon and then click *All Programs* to display all installed programs. Click *Windows mobile Device Center* to launch the application.




2. Under *Mobile Device Settings* option, click on *Connection settings.*



3. Check *Allow USB connections*



### *8.3 Connecting the Archer2 Field PC to a desktop PC*

1. Turn the PDA *ON*

2. Connect the USB cable between the Archer2 Field PC and your desktop computer.

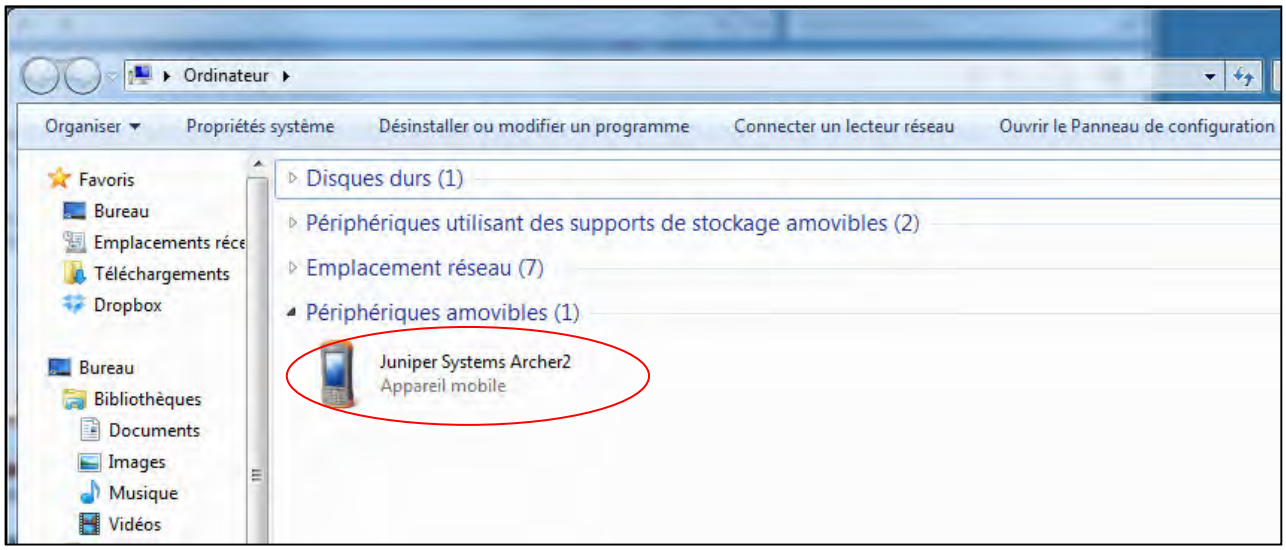
3. The desktop *ActiveSync* (or Windows Mobile Device Center) icon is now green.

4. A small *PCLink* icon appears on the Archer2 title bar.

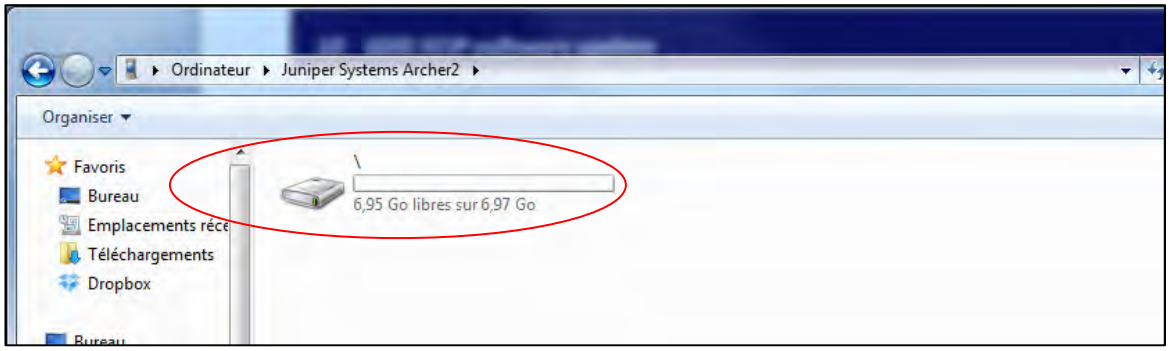
### *8.4 Transferring file(s) from the Archer2 Field PC to a desktop PC*

1. Double click on the *My Computer* icon on your desktop PC.

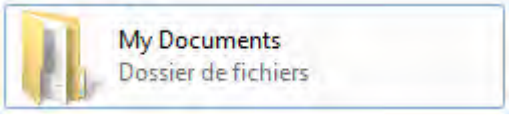
2. Double click on the *Mobile Device's* icon.




3. Double click on the *Main folder* icon.

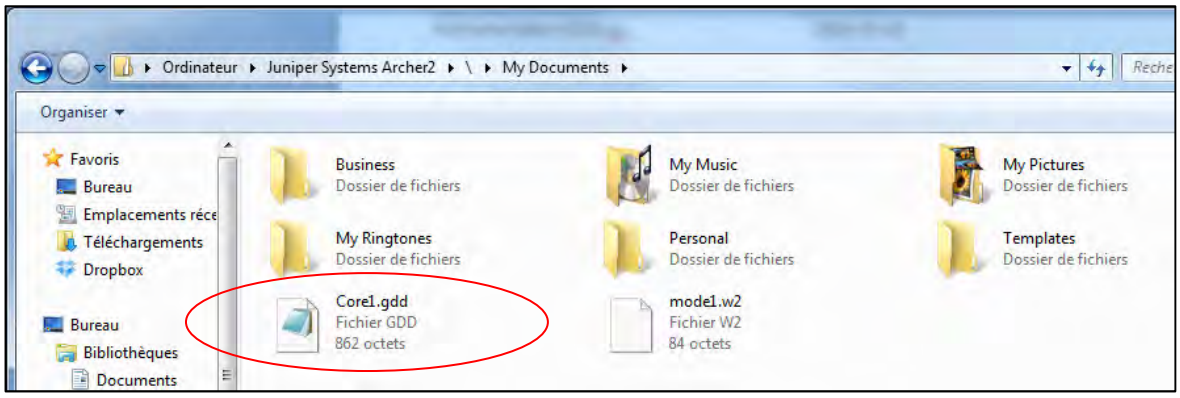



4. Double click on the *My Documents* folder.



5. Use the drag and drop or cut, copy and paste functions to move file(s) between your Archer2 and your desktop PC.

   The data file is named: File_Name.gdd




6. Open the saved files with Notepad or Excel.

# 9 Bluetooth configuration

## 9.1 Bluetooth partnership configuration

1. Make sure that the Bluetooth is on. If the Bluetooth icon in the Dashboard of the Archer2 Field PC is gray, click on the icon to enable it.

2. Click on the Bluetooth icon in the Title bar.

3. Click on *Add new device*.

4. The program searches for Bluetooth Devices. This step may take a few seconds.

5. Select the GRx2's name (*RxXXXX*) and click on *Next*.

6. Enter the passcode *1234* and click *Next*. Open the virtual keyboard or use the numeric keypad of the Archer2 Field PC.

7. This message may appear for a few seconds. Click on Advanced or wait until it disappears and click on your GRx2 name.

8. Check *Serial Port* and click on *Save*.

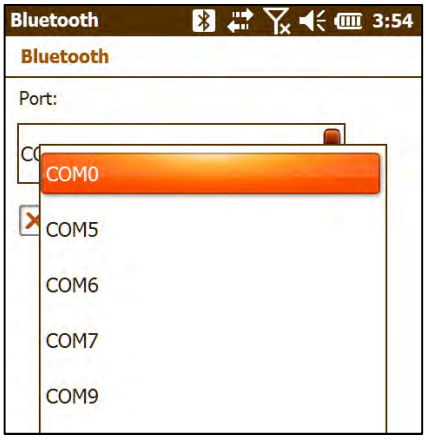
9. Select *COM Ports*.

10. Click on *New Outgoing Port*.

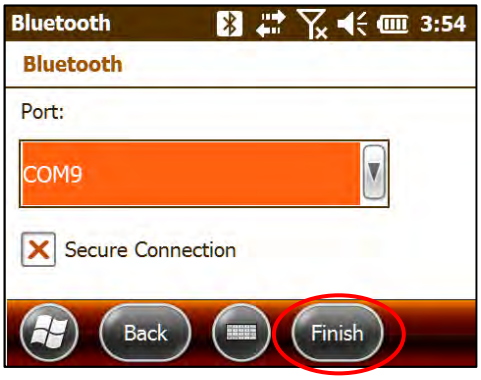
Bluetooth
3:53
Mode
COM Ports
Devices
After pairing with a device, to set up a COM port tap New Outgoing Port. For other options, tap and hold an existing port.
New Outgoing Port
OK

11. Select your GRx2's name and click on *Next*.

12. Open the Port menu.



13. Select *COM9* and click *Finish*.




14. The name of your GRx2 receiver should appear with the COM9 tag. Click on the OK button to close the window.

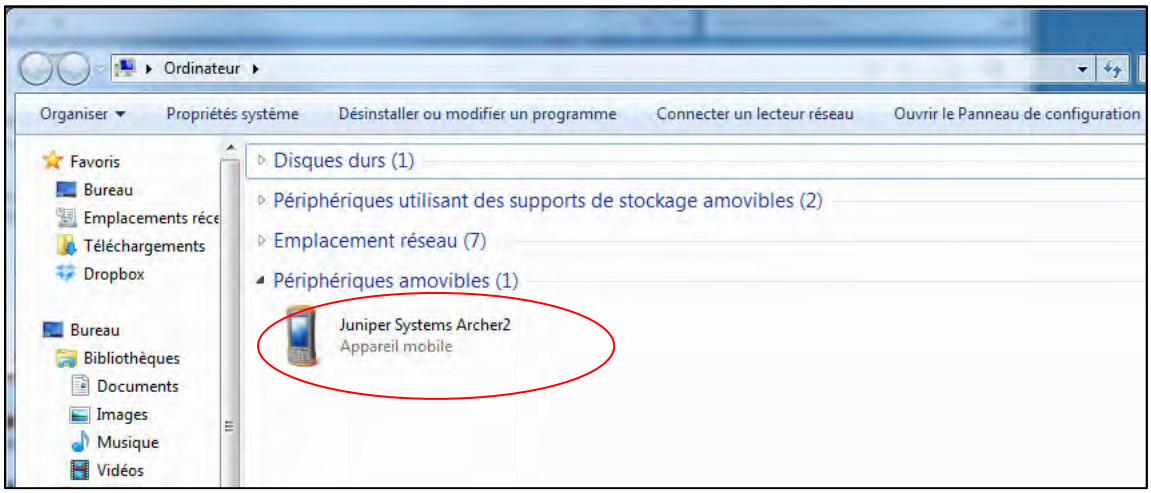
Bluetooth
3:56
Mode
COM Ports
Devices
After pairing with a device, to set up a COM port tap New Outgoing Port. For other options, tap and hold an existing port.
SC2122 (COM9)
New Outgoing Port
OK

# 10 GDD Rx software update

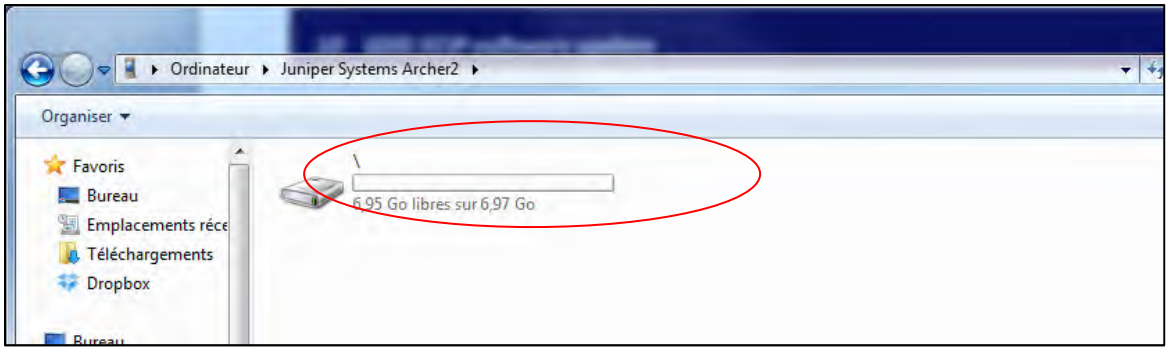
1. Connect the USB cable between the Archer2 Field PC and your desktop computer.

2. Double click on the *My Computer* icon on your PC's desktop .

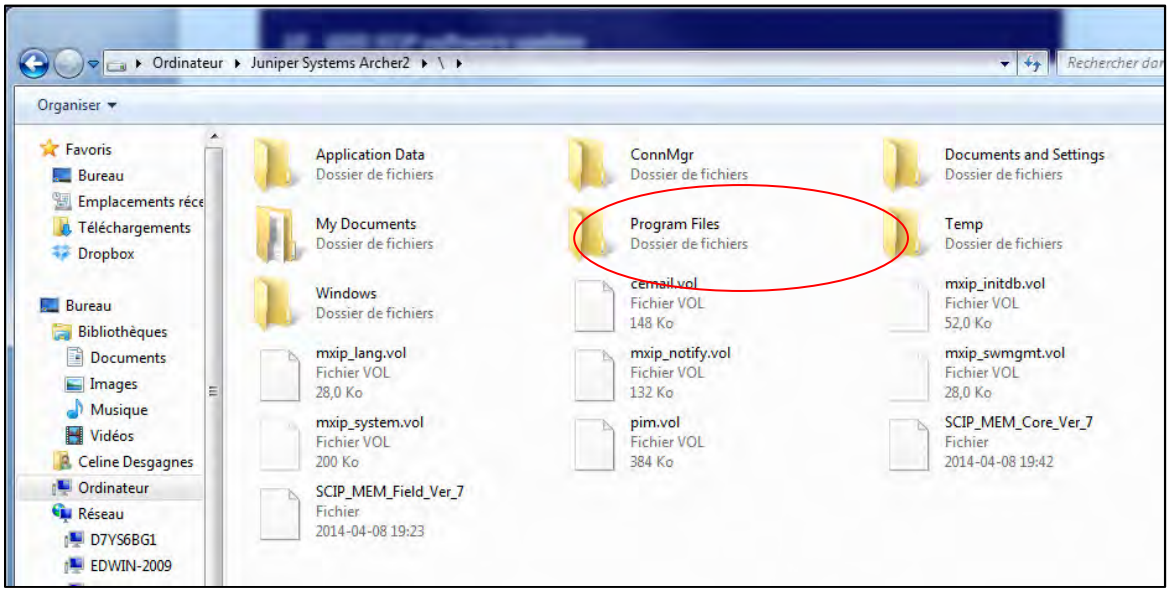
3. Double click on the *Mobile Device* icon.



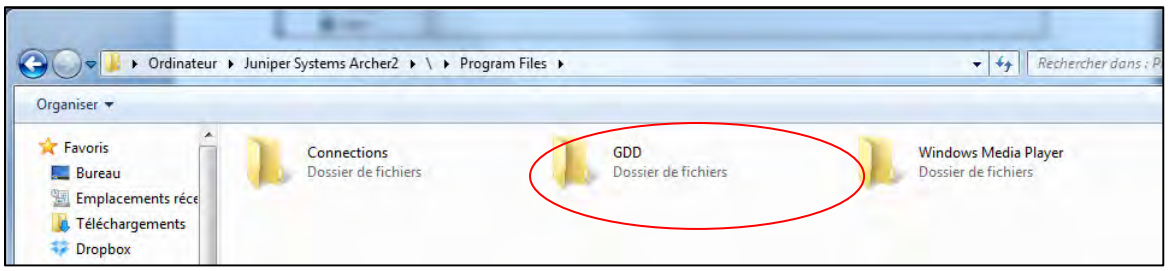
4. Double click on the *Main folder* icon.



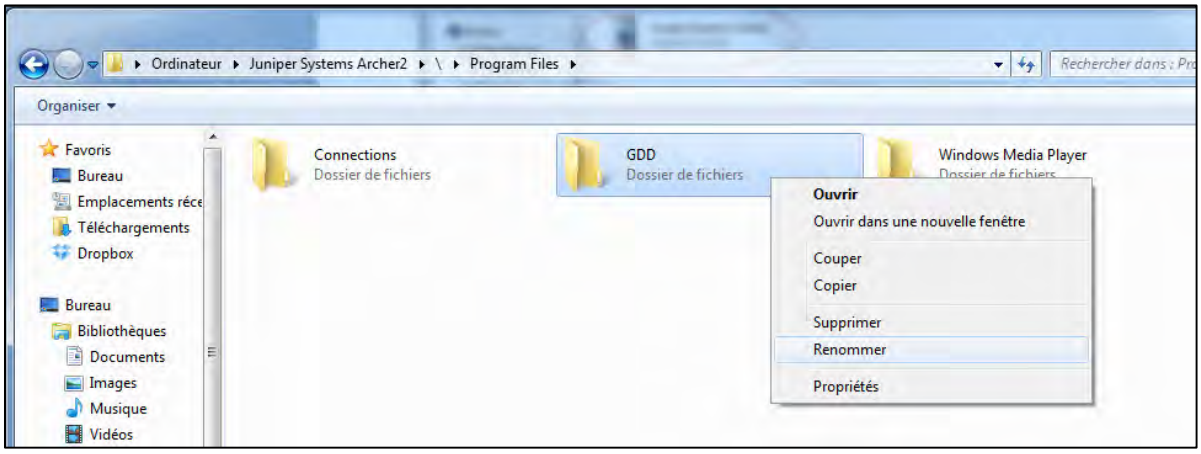

5. Double click on the *Program Files* icon.



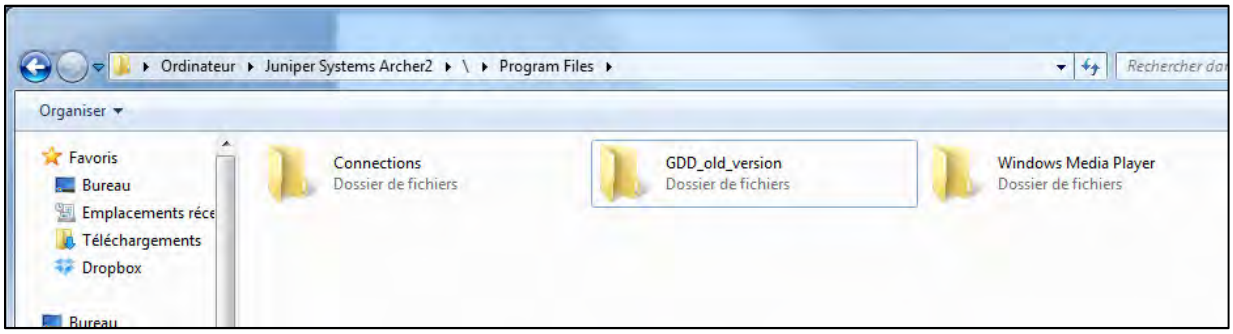

6. The GDD Rx program files are located in the GDD folder.



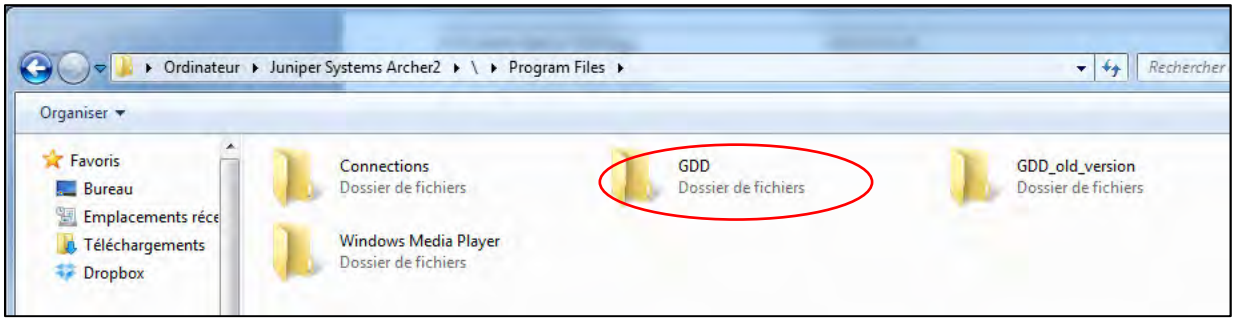
7. Rename the old version of the folder to keep a backup on your Archer2 Field PC. Right click on the GDD folder and select Rename.



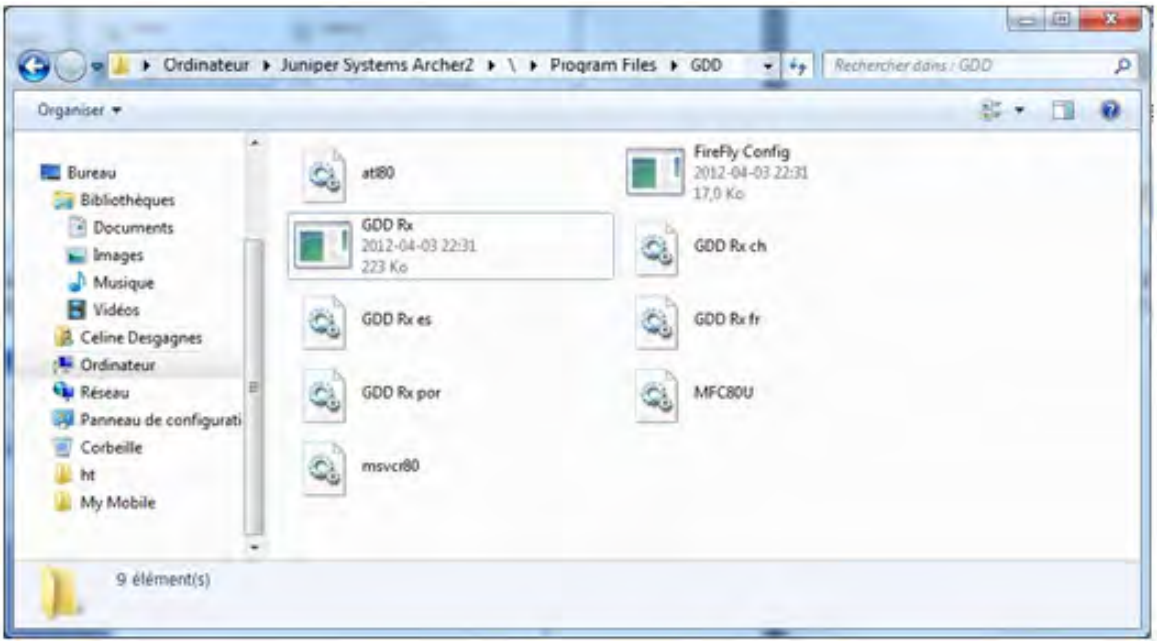

8. Rename the folder (example: GDD_ Old_Version).




9. Right click on the *Program Files* window and create a new GDD folder.



10. Use the drag and drop or the copy and paste functions to move the new GDD Rx software files from your computer to the GDD folder of your Archer2 Field PC.



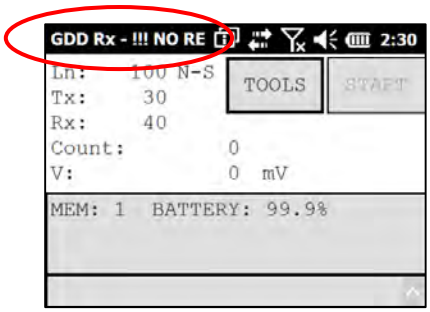
# 11 Troubleshooting

This section explains some problems that could occur when using the GDD Rx2 as well as proposed solutions.

For any issues regarding the Archer2 Field PC other than these related to the GDD program, please refer to the user manual of the Archer2 Field PC available on the utilities CD provided by GDD.

➢ Problem :

The message: 'GDD Rx – No Receiver' is shown in the program bar of the GDD Rx program. It stays on the bar even if the Archer2 Field PC is connected to the receiver.

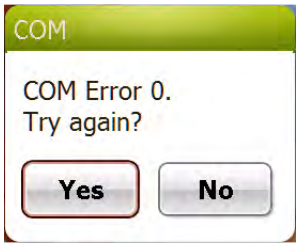



✓ Answer

- Check that the receiver's On-Off switch is at On and that the LED is on.
- Verify that the receiver's batteries are powered enough and not within the critical threshold limit.
- In Cable mode, verify that the cable is plugged correctly on the receiver and on the Archer2 Field PC.
- In Bluetooth mode, close the GDD Rx program and try to start it again. If the program does not detect the receiver in Bluetooth mode, open the program in RS232 mode and save all your data. When your data are saved, reset your Archer2 Field PC by pressing and holding the Power button. The following message appears. Select Reset.

➢ Problem :

In Bluetooth mode, the following message appears.




✓ Answer :

- Make sure that the Cable / Wireless switch is on Wireless position and that the receiver is turned on.

- Look at the Bluetooth icon in the Dashboard:

If it is gray, click on the icon to enable it.

Try to start the SCIP software in Bluetooth mode again.

- See *Section 9.1* to know how to verify if a partnership has been established between your receiver and your Archer2 Field PC.

- Reset your Archer2 Field PC by pressing and holding the Power button. The following message appears. Select Reset.

➢ <u>Problem</u> :

The message “Battery Error” appears on the main screen of the GDD Rx program on the Archer2 PDA.

✓ <u>Answer</u> :

- A problem occurs during the receiver battery charging : over voltage, charging under 0°C or over 45°C, charging time too long, defective battery, etc.

- Try to disconnect and connect the AC charger.

➢ <u>Problem</u> :

A red icon appears during the acquisition process.

✓ <u>Answer</u> :

- Click on the red icon to see what happens.

- This alarm usually means that the Vp is saturated. The channels of the receiver are protected against voltage up to 500V but they can read a Vp of up to 15V only.

# 12 Technical help

If you encounter a problem not described in this manual, do not hesitate to contact **Instrumentation GDD Inc.** for help at:


Tel.: (418) 877-4249
Fax: (418) 877-4054
Toll free line: 1 877 977-4249
e-mail: gdd@gddinstrumentation.com


Emergency out of business hours:


| | | |
|---|---|---|
| Pierre Gaucher: | Home phone: | (418) 657-5870 |
| | Cell phone: | (418) 261-5552 |
| Régis Desbiens: | Home phone: | (418) 658-8539 |
| | Cell phone: | (418) 570-3408 |


Any GDD IP Receiver that breaks down while under warranty or service will be replaced free of charge upon request for the duration of repairs, except for shipping fees. This service is subject to instrument availability but we have been able to honour this commitment up to now.


Printed in Canada in April 2009. *VER0-3.12*

# 13 Specifications

## 13.1 General specifications

| | |
|---|---|
| Number of channels: | 2 |
| Size: | 23.2 x 19.2 x 11.1 cm (9.12 x 7.56 x 4.37 in) |
| Weight: | 1.5 kg (3.2 lbs) |
| Enclosure: | Heavy-duty Pelican case, environmentally sealed |
| Communication options: | RS-232 (serial) and Bluetooth class I to communicate with a PDA<br>USB for data download |
| Power supply: | 10.8V 3.4Ah rechargeable Ion-Lithium internal battery |
| Temperature range: | -40 to +60$^{o}$C (-49 to +140$^{o}$F) |
| Humidity range: | Waterproof |

## 13.2 Technical specifications

| | |
|---|---|
| Survey capabilities: | Resistivity and Time domain IP |
| Twenty chargeability windows: | Arithmetic, logarithmic, semi-logarithmic, Cole-Cole and user defined |
| Synchronization: | Automatic re-synchronization Process on primary voltage Signal |
| Noise reduction: | Automatic stacking number |
| Computation: | Apparent resistivity, chargeability, standard deviation, and % of symmetrical Vp |
| Ground Resistance: | Up to 1.5 MΩ |
| Signal waveform: | Time domain (ON+, OFF, ON-, OFF) |
| Time base: | 0.5, 1, 2, 4 and 8 seconds |
| Input impedance: | 5 GΩ |

| | |
|---|---|
| Primary voltage range: | ±10 uV to ±15 V for any channel |
| Protection: | 500V (on each channel) |
| Input: | True differential for common-mode rejection in dipole configuration |
| Voltage measurement: | Resolution 1 µV<br>Accuracy 0.5% |
| Chargeability measurement: | Accuracy 0.8% |
| SP offset adjustment: | ± 5 V, automatic compensation through linear drift correction per steps of 150 µV |
| Filter: | Eight-pole Bessel low-pass 15 Hz, notch filter 50 Hz and 60 Hz |

PDA menu-driven software / simple to use

Real-time data and automatic data stacking

Screen-graphics: decay curves, resistivity, chargeability, Vp

20 programmable chargeability windows

One 24 bit A/D converter per channel

Internal test generator (Self-test mode)

For more details about Archer2 rugged field PC specifications, read Archer2 manual included in the CD provided by GDD.

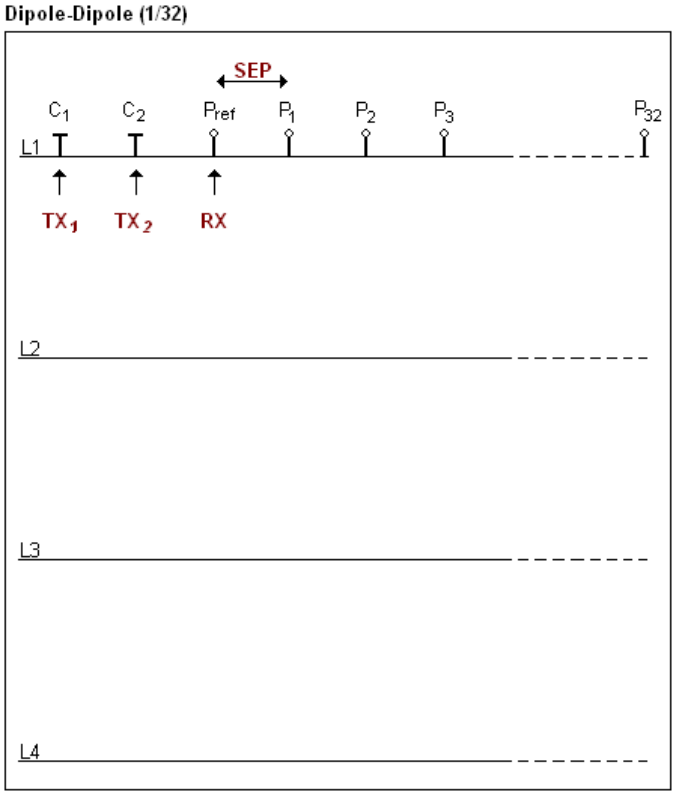
# *Annex 1 – Geometrical parameters*

This annex explains how to configure your receiver according to the selection of the electrode array.

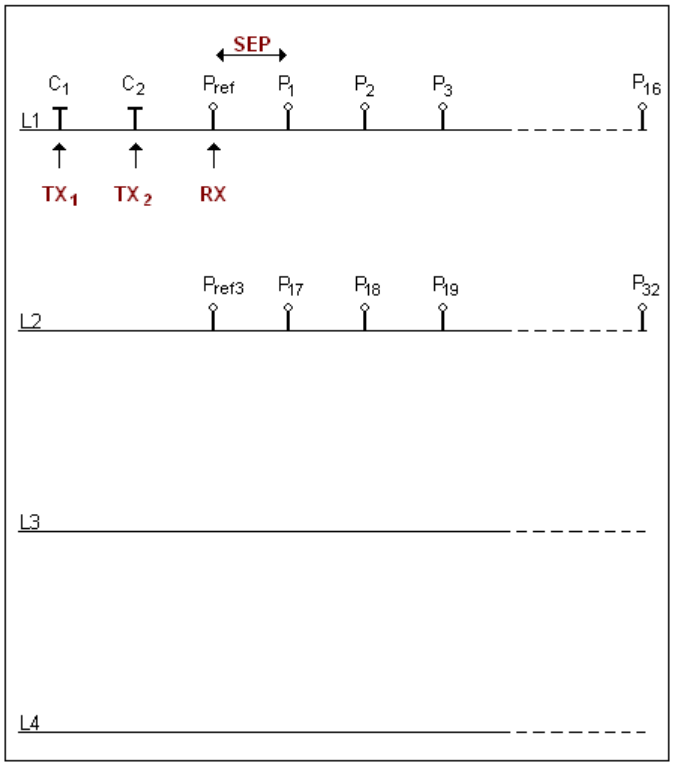
| Electrode array | Geometrical parameters to enter | | | | Maximum number of dipoles |
|---|---|---|---|---|---|
| Dipole-Dipole | Tx1 | Tx2 | Rx | Sep | 32 |
| Pole-Dipole | | Tx2 | Rx | Sep | 32 |
| Pole-Pole | | Tx2 | Rx | Sep | 32 |
| Gradient | Tx1 | Tx2 | Rx | Sep | 32 |
| Wenner | Tx1 | Tx2 | | | 1 |
| Schlumberger | Tx1 | Tx2 | | Sep | 1 |

Tx1: Transmitter first electrode position
Tx2: Transmitter second electrode position
Rx: Receiver first electrode position
Sep: Separation between two receiver electrodes

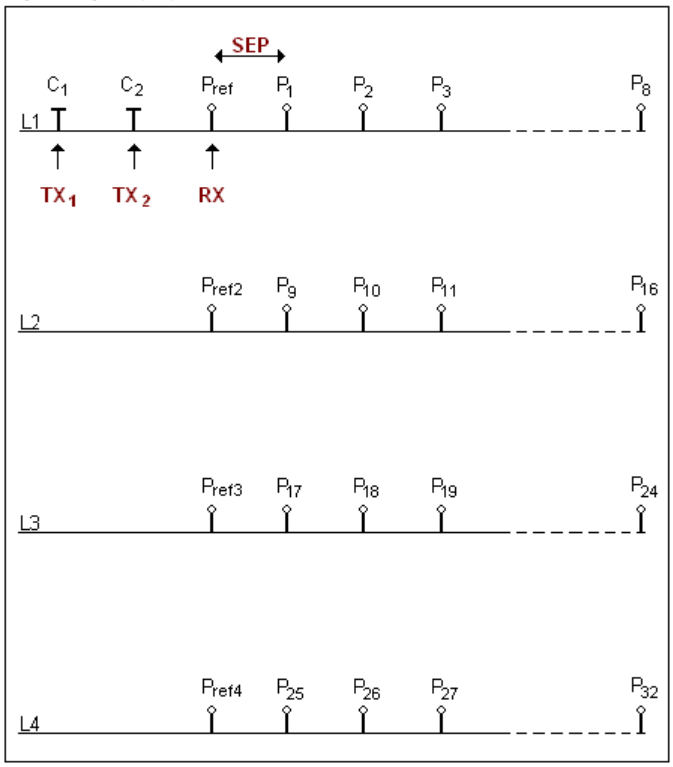
**Note: For all electrode arrays, the Tx line and the RX line(s) can be different.**



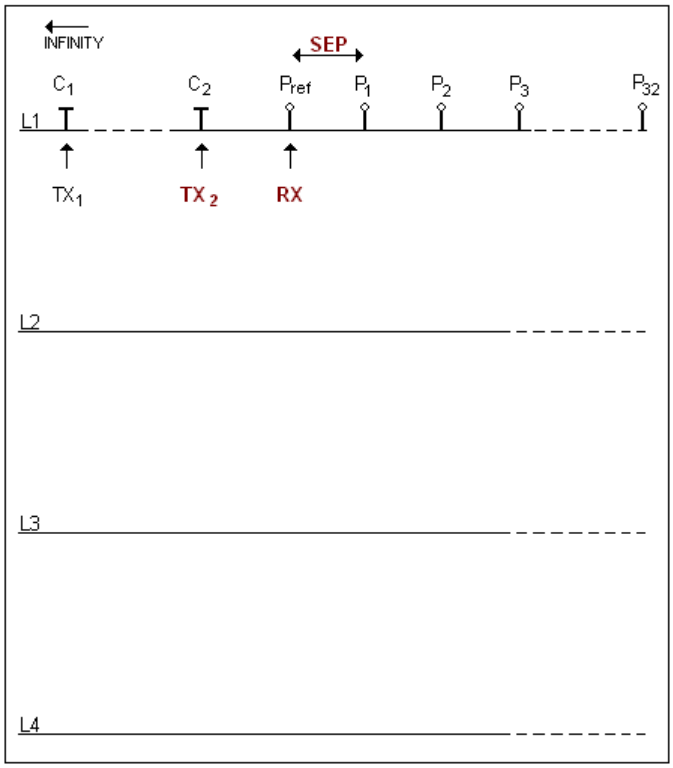
**Dipole-Dipole (2/16)**



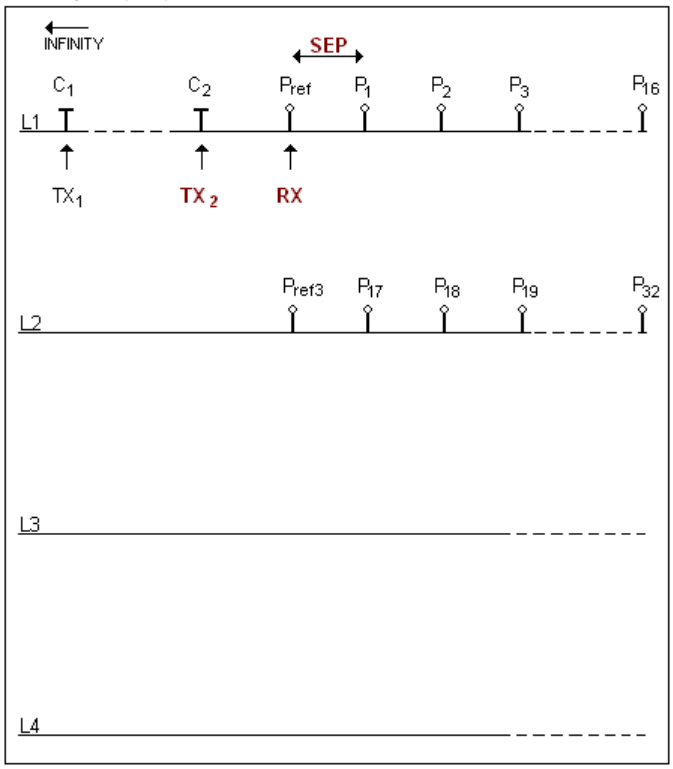

**Dipole-Dipole (4/8)**



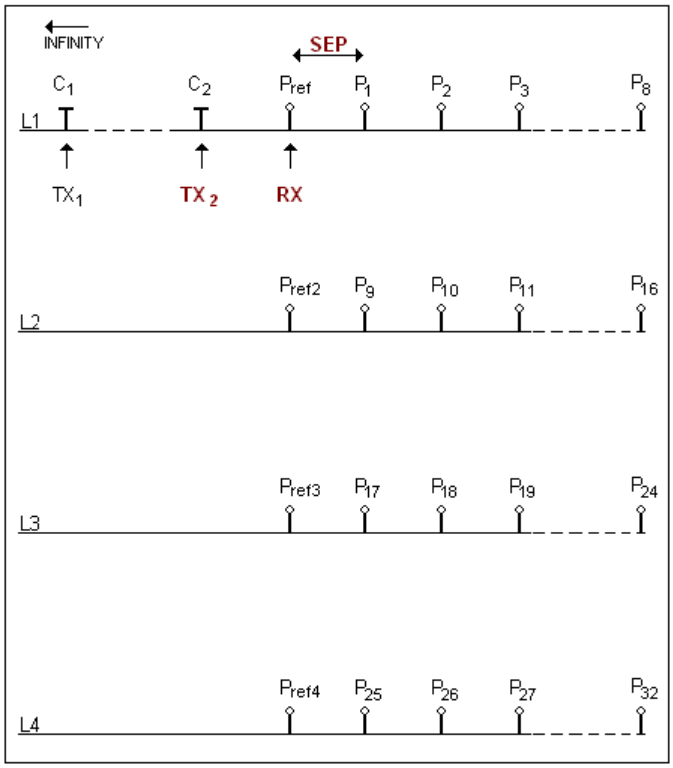
**Pole-Dipole (1/32)**




**Pole-Dipole (2/16)**

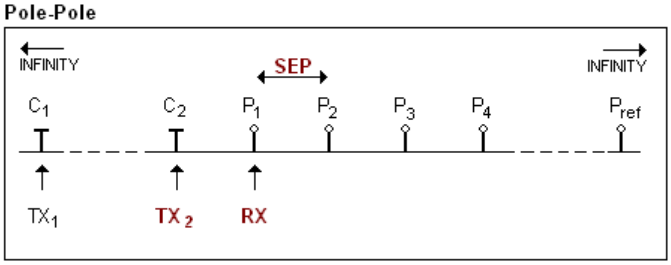


Pole-Dipole (4/8)



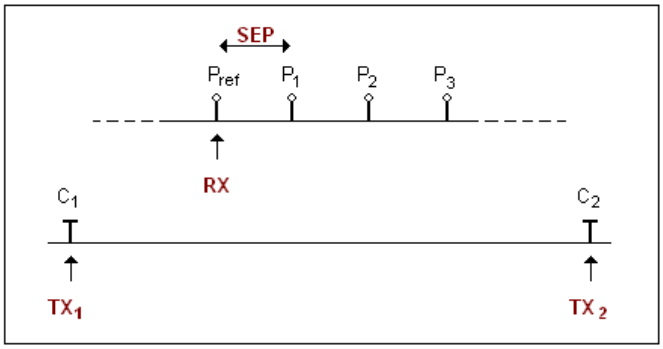

The electrodes C1 has to be set far from the other electrodes, usually 5 times the maximum distance between C2 and Pref.

Pole-Pole



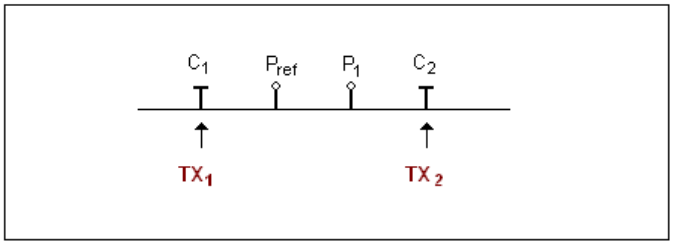

The electrodes C1 and Pref have to be set far from C2 and P1, usually 10 times the maximum distance between C2 and P1.

Gradient



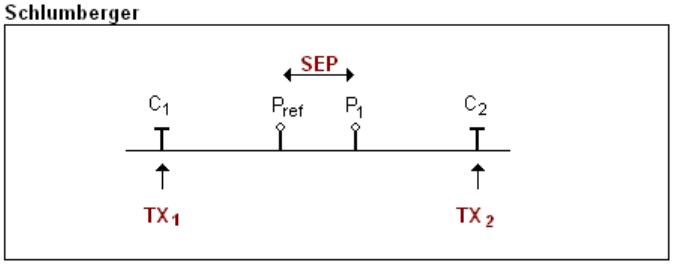

The electrodes C1 and C2 are fixed. The electrode P is moved parallel to C inside a zone located in the central part of C1, C2.

Wenner




The electrodes C1, Pref, P1 and C2 are equidistant.

Schlumberger

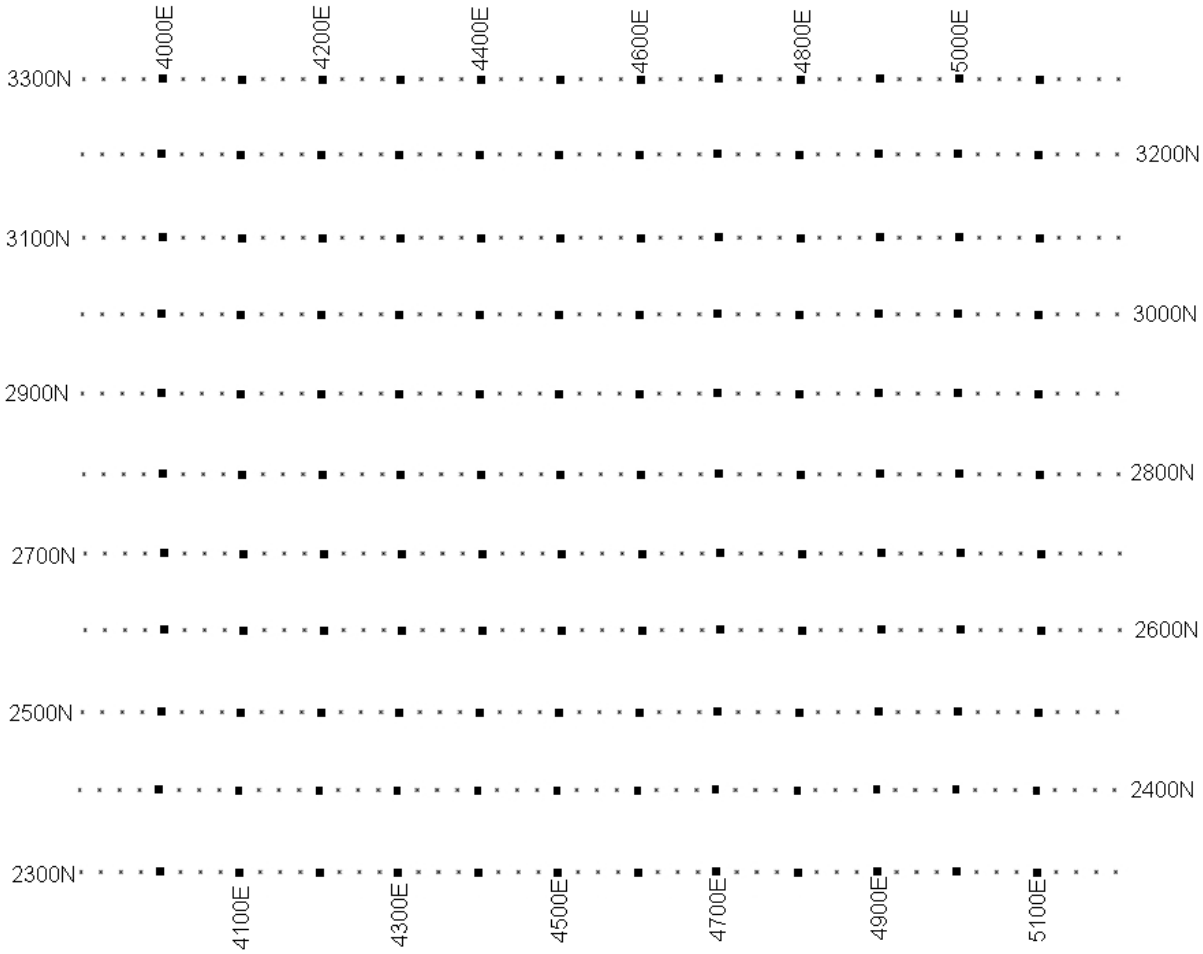



The electrodes Pref and P1 are located at the middle point of electrodes C1 and C2.

# *Annex 2 – Field survey setup*

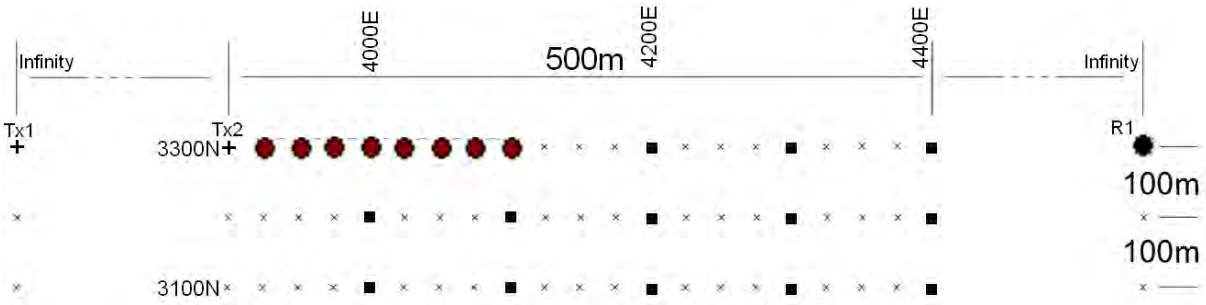
***Survey setup***

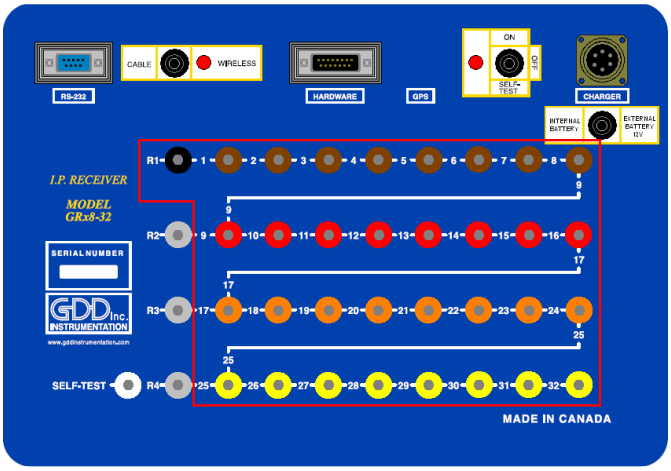
Line information




This survey will consist of 11 lines, each separated by 100m. Each line is 1.3 km long. The examples below will begin at position 3300N-3900E.

***Pole-Pole***

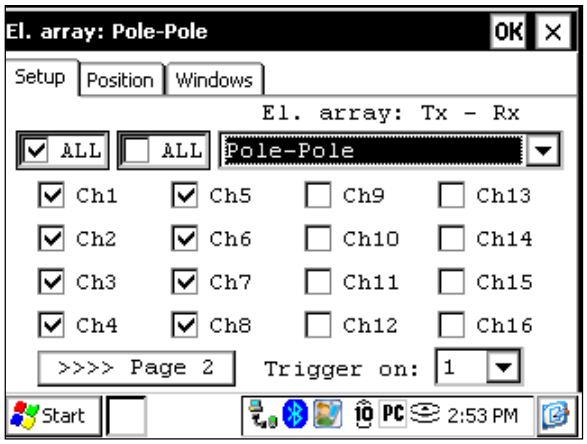


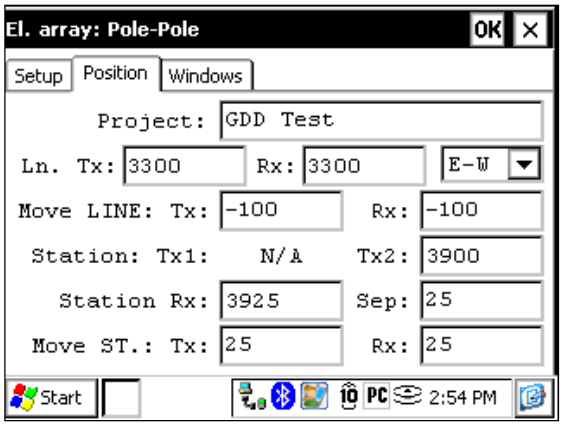

Legend
x Station
\+ Tx electrode
Rx electrode
R1 Reference electrode

For this pole-pole setup, 8 electrodes of the GDD-Rx will be used.

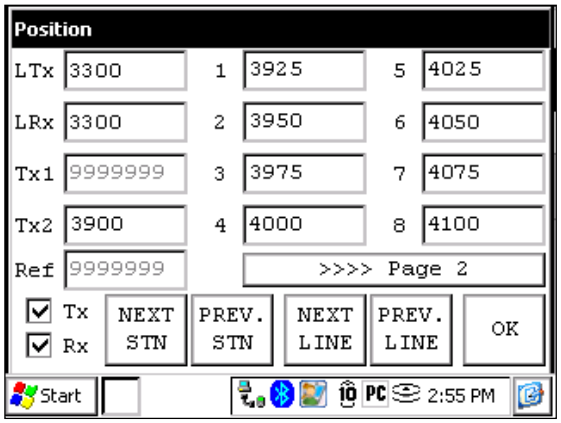
1) Select Pole-Pole in the setup page.



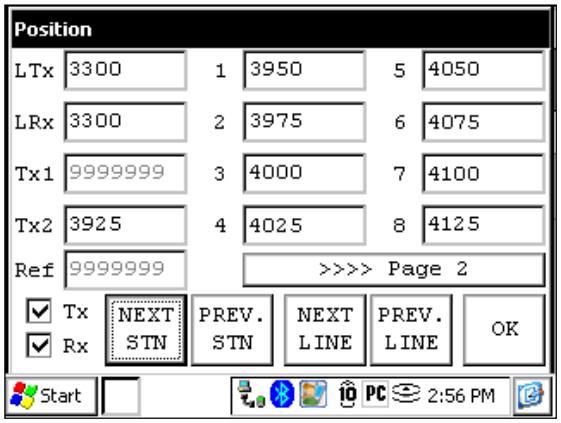
2) Enter the positions corresponding to your survey parameters.



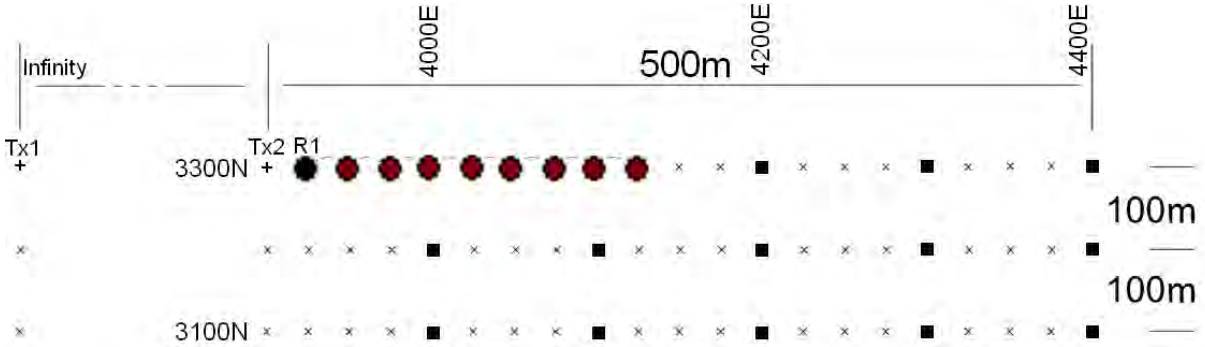

3) If all the values are correct, click the Ok button to continue and take a reading. If something is incorrect, you can modify it on this page.

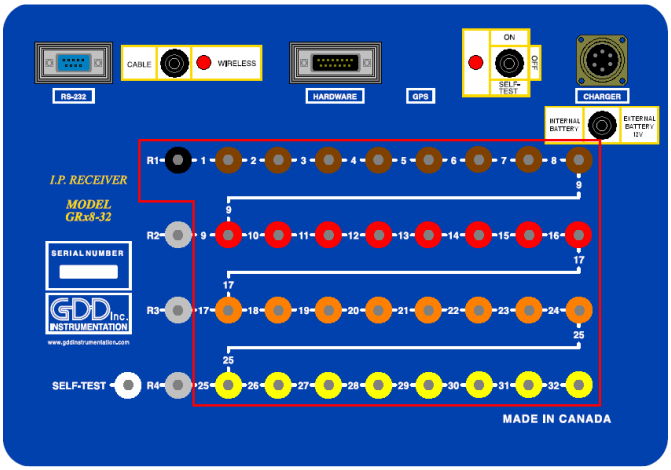


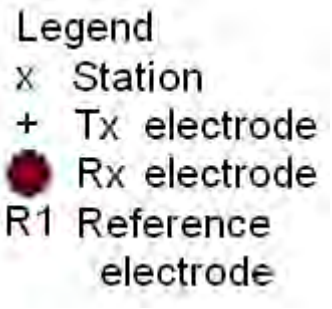

4) When the reading is done, click the NEXT STN button to increment the positions.



***Pole-Dipole (1/32)***

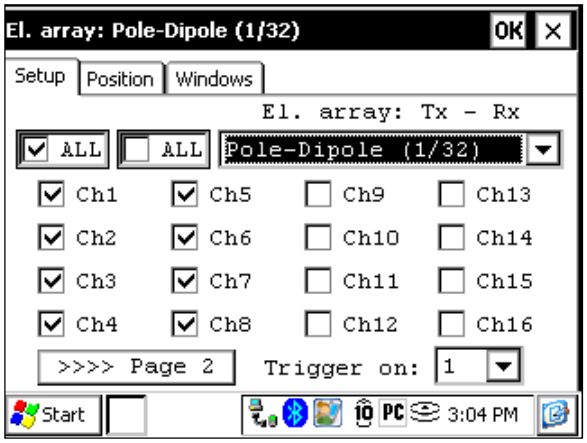


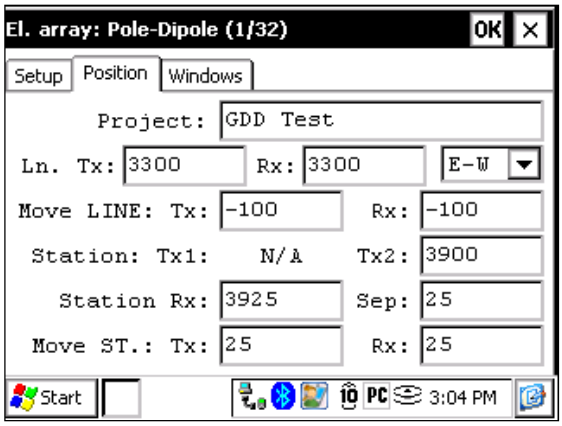




For this pole-dipole setup, 8 electrodes of the GDD-Rx will be used.

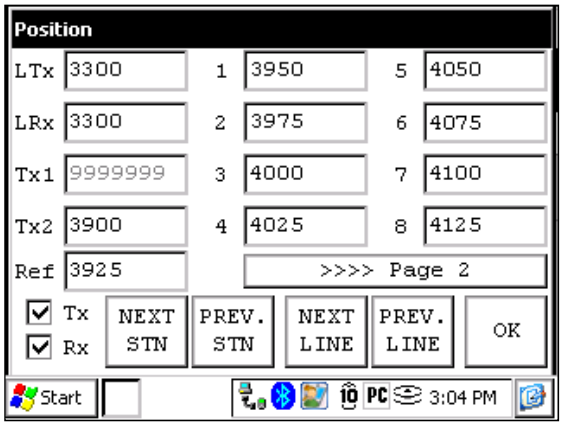
1) Select Pole-Dipole(1/32) in the setup page. The Pole-Dipole (2/16) and Pole-Dipole (4/8) options are explained in the 3D survey section at the end of this document.



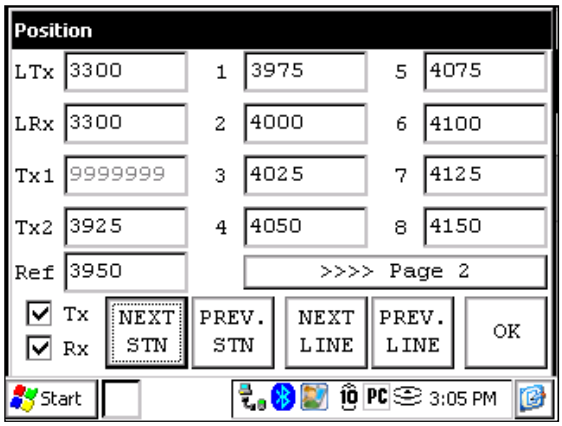
2) Enter the positions corresponding to your survey parameters.



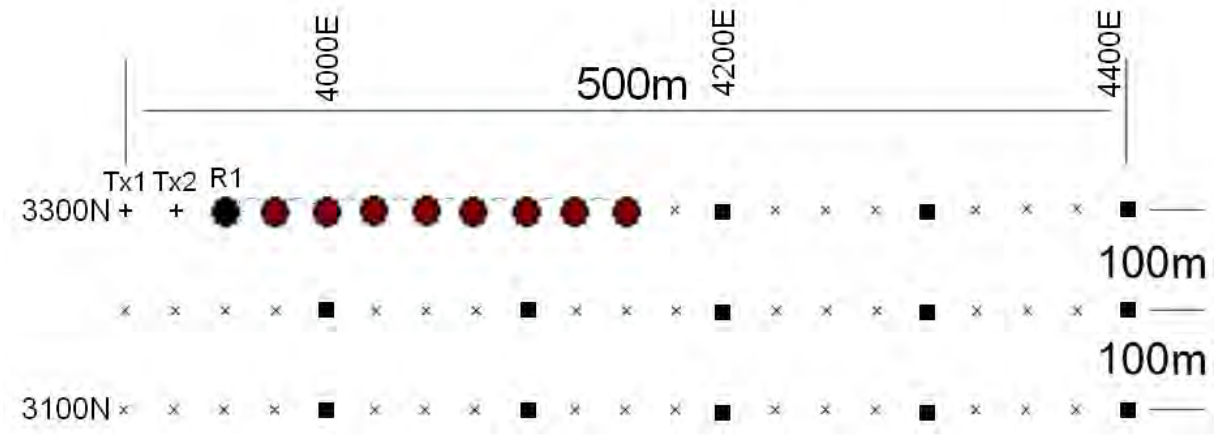

3) If all the values are correct, click the Ok button to continue and take a reading. If something is incorrect, you can modify it on this page.

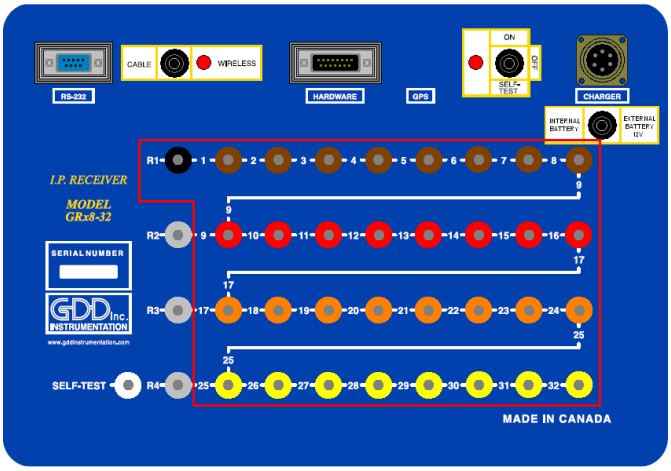



4) When the reading is done, click the NEXT STN button to increment the positions.



***Dipole-Dipole (1/32)***

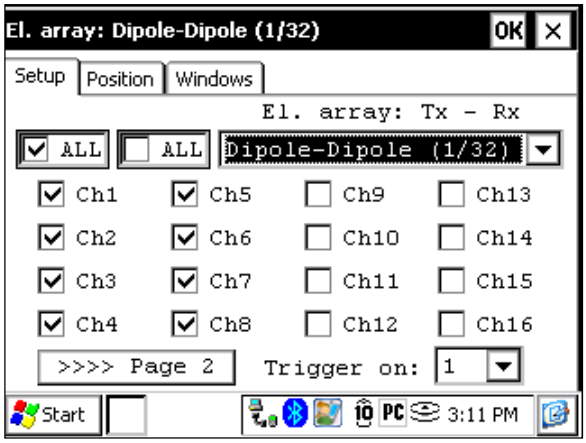


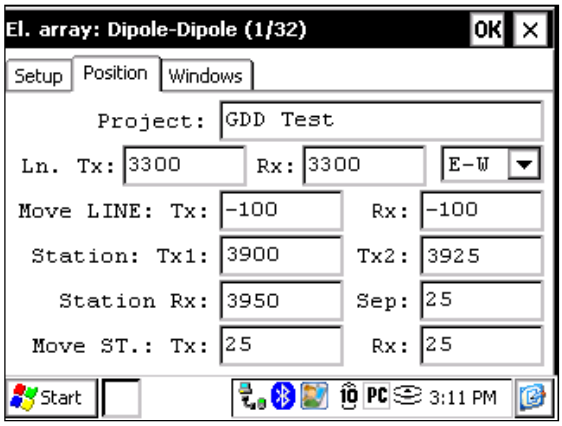

Legend
x Station
\+ Tx electrode
Rx electrode
R1 Reference electrode

For this dipole-dipole setup, 8 electrodes of the GDD-Rx will be used.

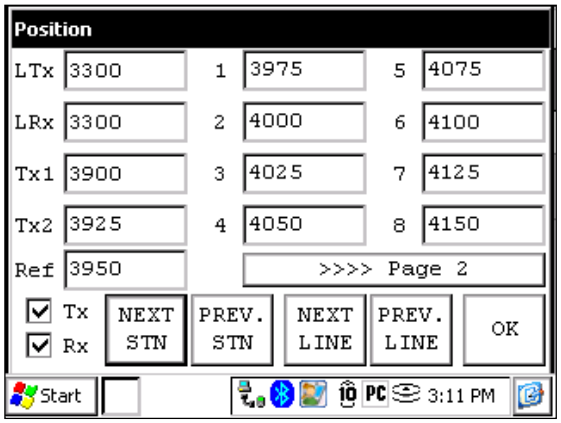
1) Select Dipole-Dipole (1/32) in the setup page.



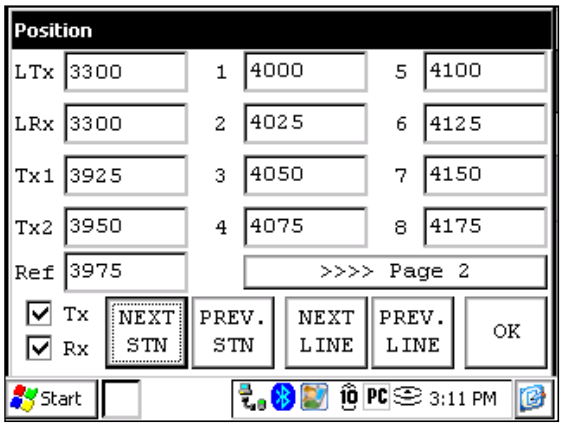
2) Enter the positions corresponding to your survey parameters.



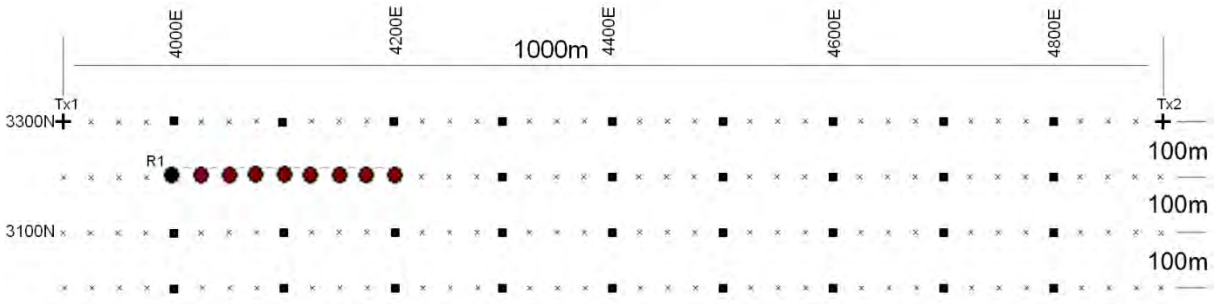

3) If all the values are correct, click the Ok button to continue and take a reading. If something is incorrect, you can modify it on this page.

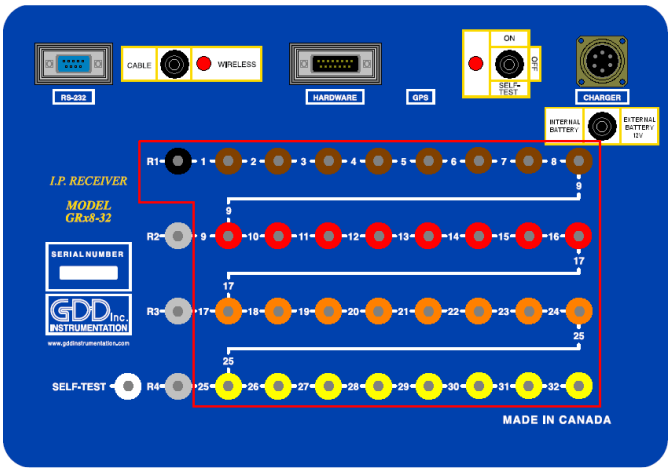



4) When the reading is done, click the NEXT STN button to increment the positions.



***Gradient***




Legend

x Station

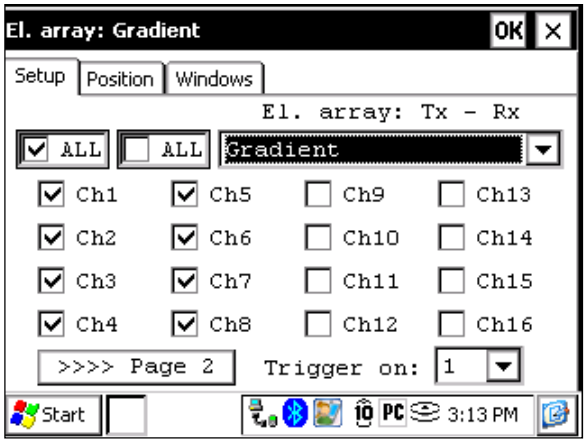
\+ Tx electrode

Rx electrode

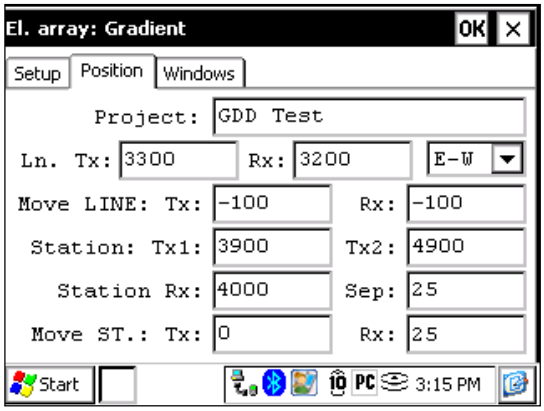
R1 Reference electrode

For this Gradient setup, 8 electrodes of the GDD-Rx will be used.

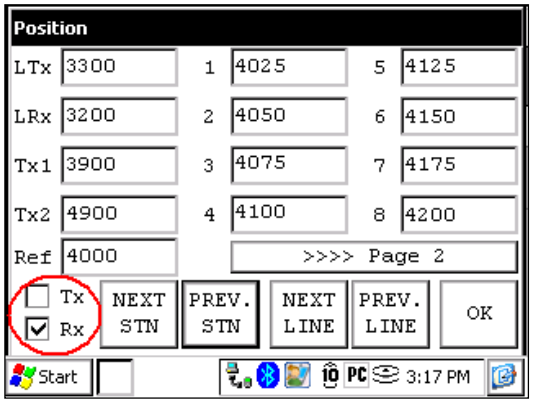
1) Select Gradient in the setup page.



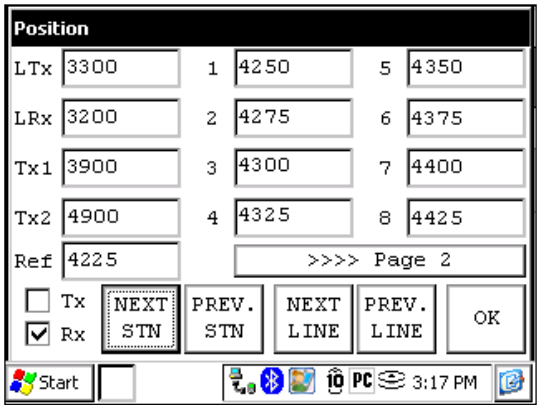
2) Enter the positions corresponding to your survey parameters.



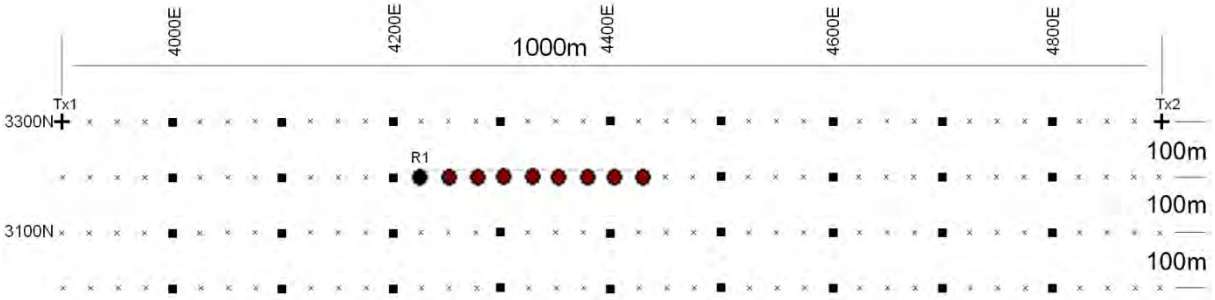

3) If all the values are correct, click the Ok button to continue and take a reading. If something is incorrect, you can modify it on this page. Uncheck the Tx box so only the Receiver electrodes position will change.



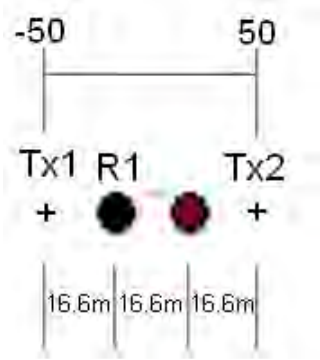

4) When the reading is done, make sure that the Tx box is unchecked, click the NEXT STN button to increment the positions, only the Receiver electrodes position will change.

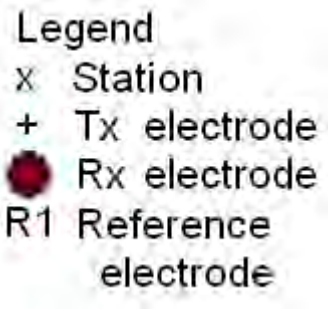


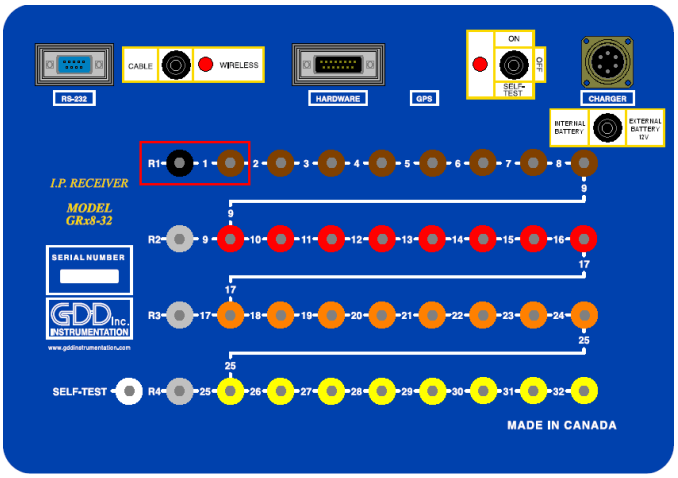

5) Your next setup on the field should be like this.




***Wenner***

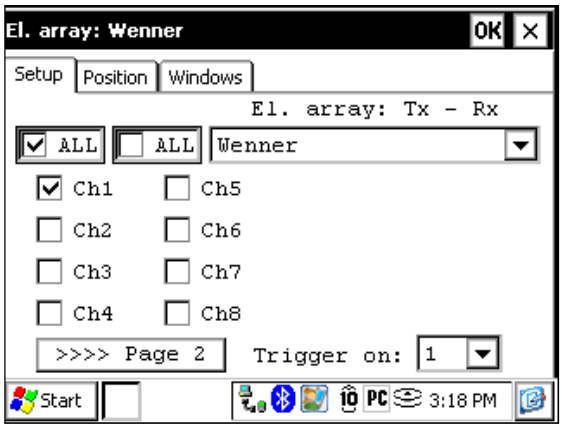


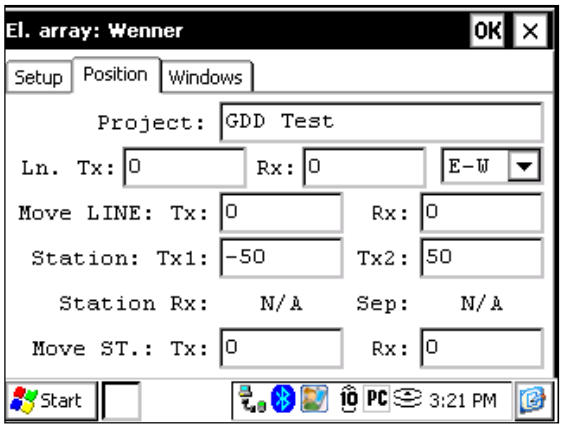




A Wenner setup uses only two electrodes, the Reference R1 and the electrode 1 of the GDD Rx.

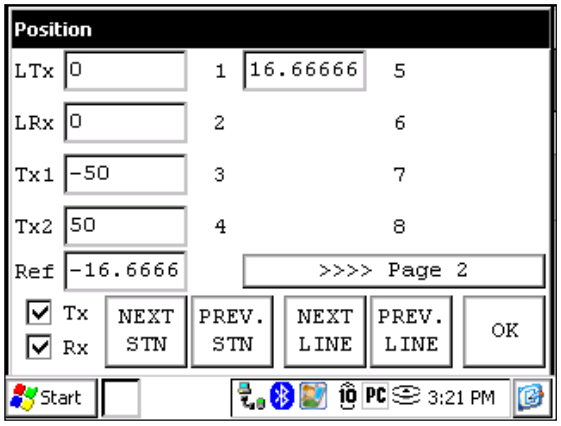
1) Select Wenner in the setup page and check only one channel.




2) Enter the positions corresponding to your survey parameters.

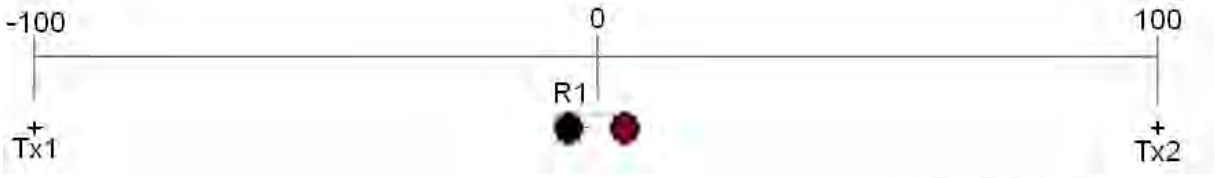


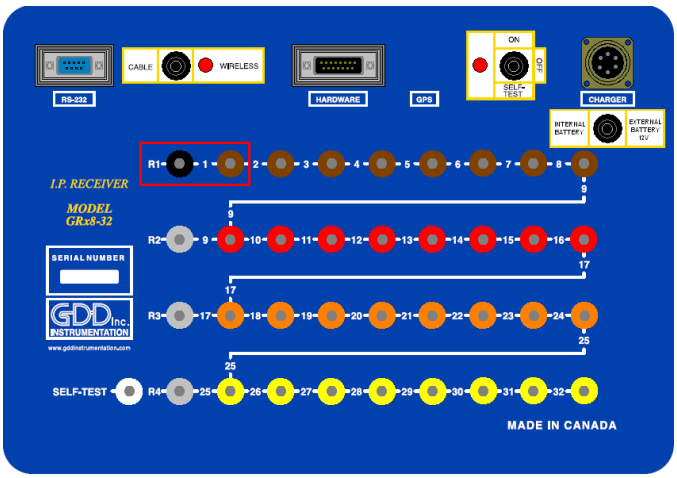

3) If all the values are correct, click the Ok button to continue and take a reading. If something is incorrect, you can modify it on this page.




4) For a Wenner survey, you will have to manually enter the parameters for each reading. To access the Position page, click the Tools button and select the Config option in the pop-up menu.

***Schlumberger***

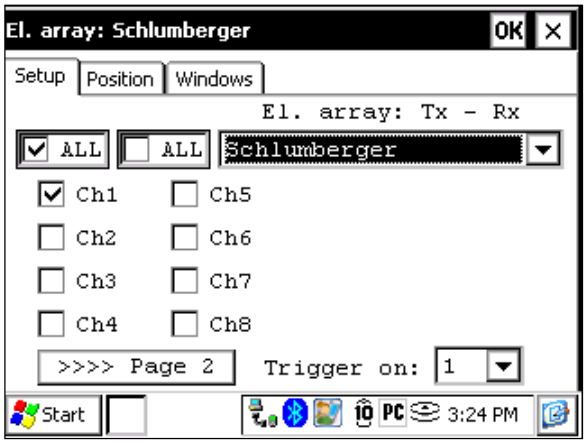


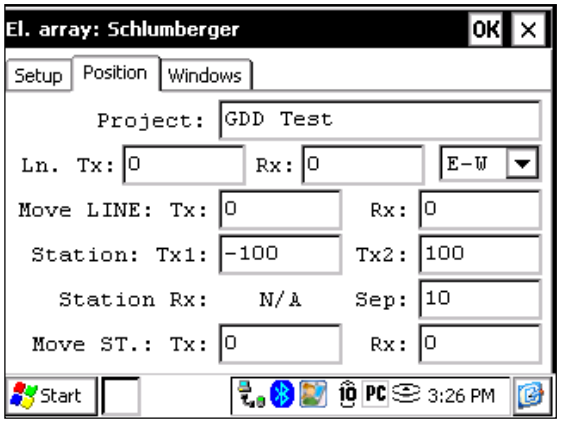

Legend
x Station
\+ Tx electrode
Rx electrode
R1 Reference electrode

A Schlumberger setup uses only the Reference R1 and the electrode 1 of the GDD Rx.

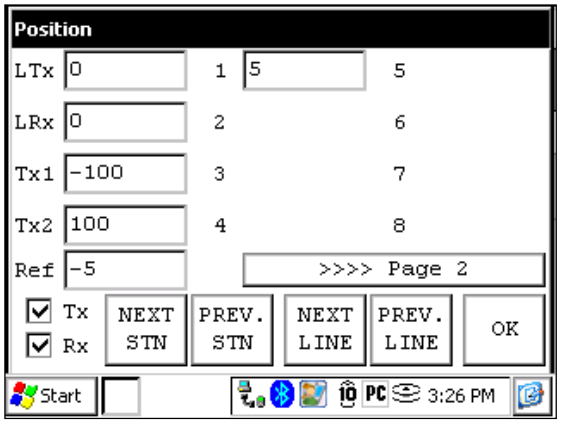
1) Select Schlumberger in the setup page.



2) Enter the positions corresponding to your survey parameters.

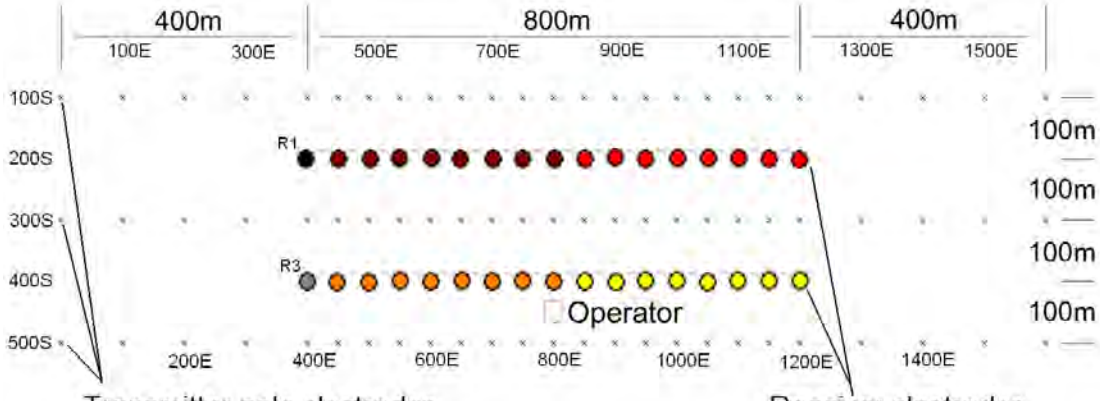



3) If all the values are correct, click the Ok button to continue and take a reading. If something is incorrect, you can modify it on this page.



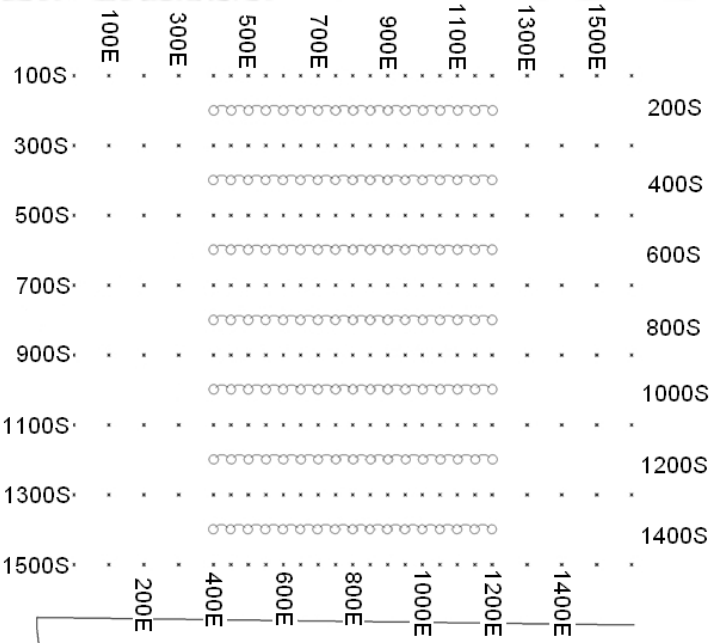

4) For a Schlumberger survey, you will have to manually enter the parameters for each reading. To access the Position page, click the Tools button and select the Config option in the pop-up menu.

***3D Survey***




Transmitter pole electrodes
3 lines of electrodes
100m either side of the receiver line
17 electrodes plus 4 at each end
=25 per line x 3 lines
=75 transmitter pole electrodes

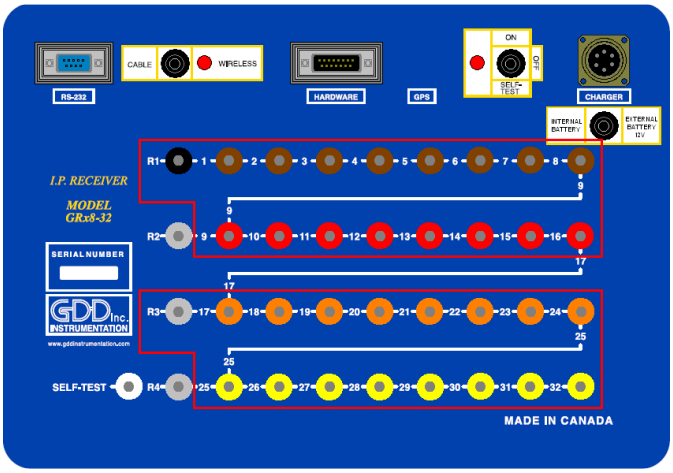
Receiver electrodes
2 lines
17 electrodes per line
16 dipoles per line
Fixed location



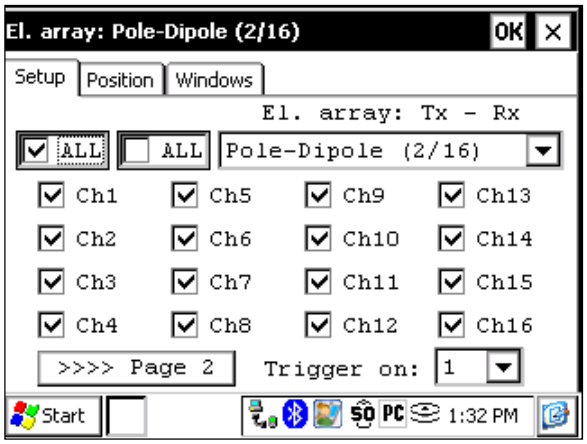

Wire from remote electrode

Remote electrode
at least 2km distant
Preferably in standing
water (such as a dam).

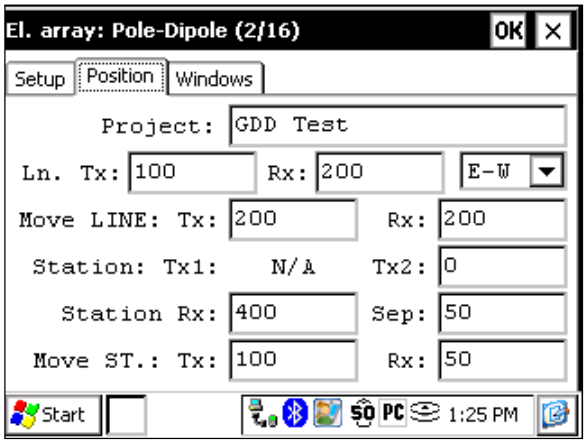
As shown on the images on the previous page, this setup is for 2 lines of 16 dipoles each using a GDD Rx-32. For the reference pins, R1 and R3 will be used; R2 and R4 will not be used since this is a 2 lines setup.



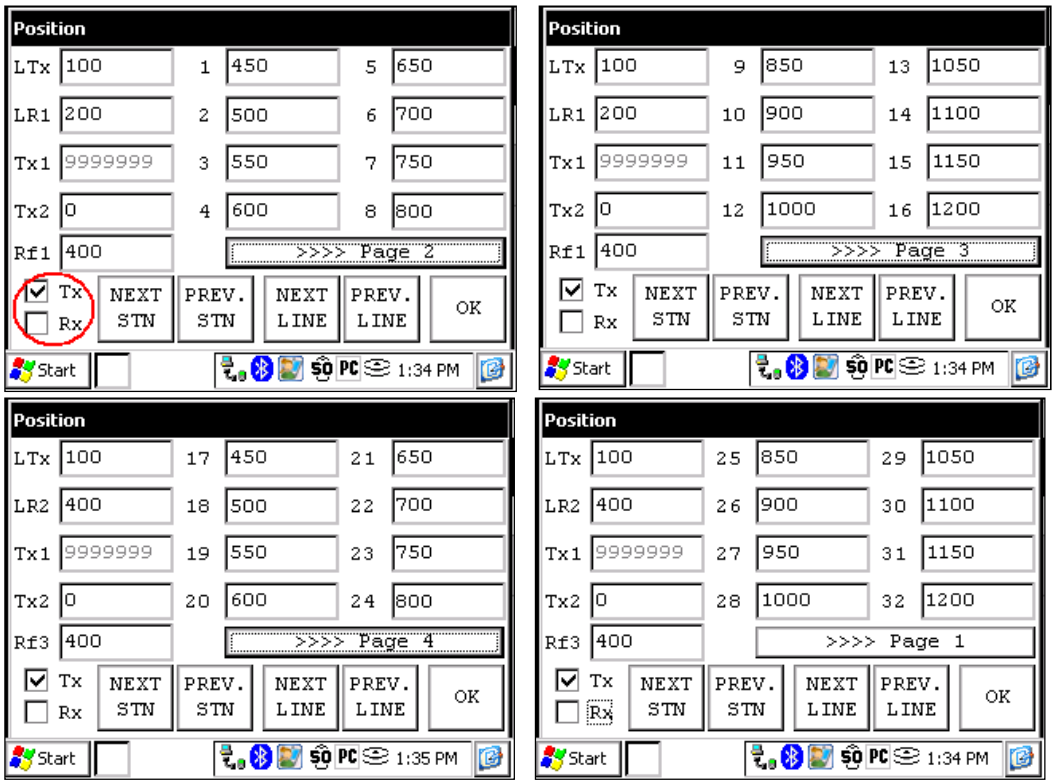

1) Select the Pole-Dipole 2/16 on the Setup tab.



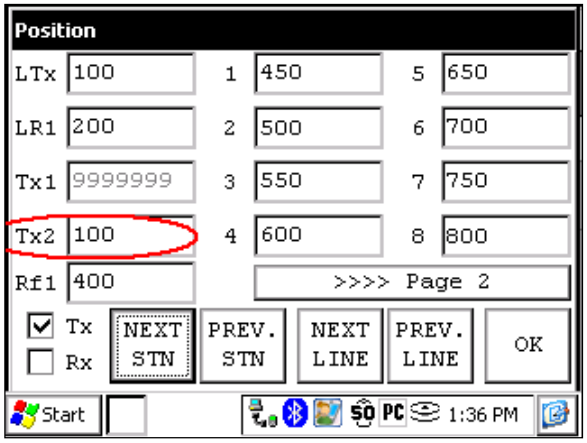

2) On the Position tab; enter the parameters of your survey.



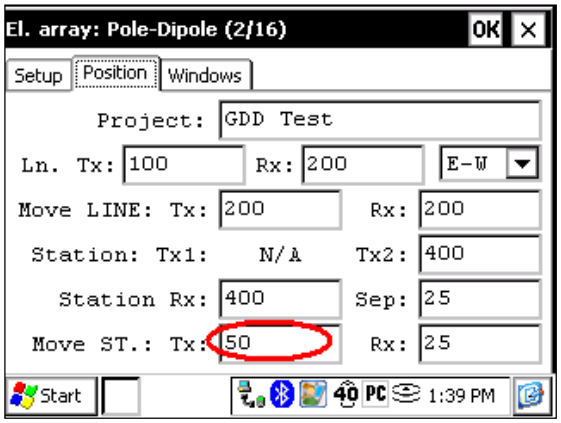
3) Uncheck the Rx box so only the Tx position will change when you click the NEXT STN and NEXT LINE buttons. Verify that the positions of the 32 electrodes are set properly. Hit the OK button to close this window. On the next screen, click Start to take readings.



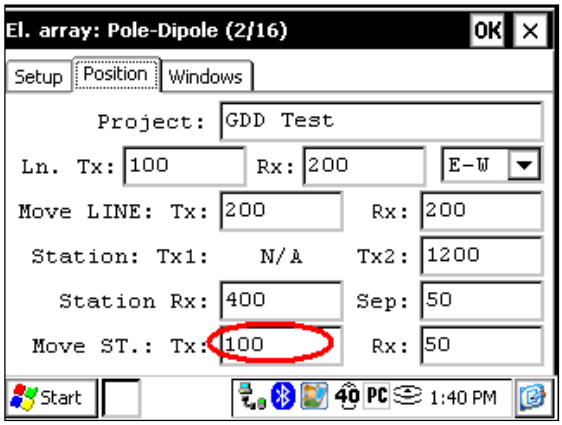

4) When readings are done and stored, click the Start button. Click the NEXT STN button and only the Tx2 station will be incremented by 100 since it was entered as the Tx spacing.



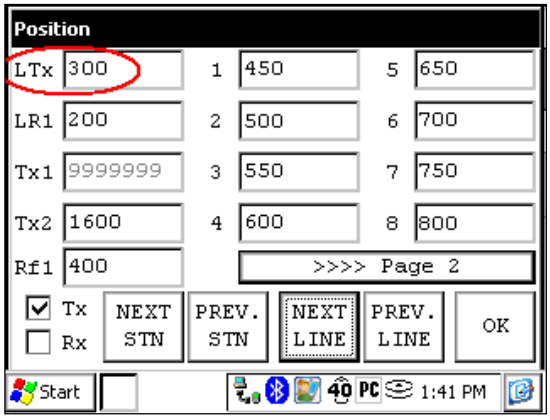
5) When Tx2 station position is 400, you will have to modify the spacing from 100 to 50. Select Tools -> Config and the next screen will appear. Select the Position tab and change the Move St.: TX: to 50.



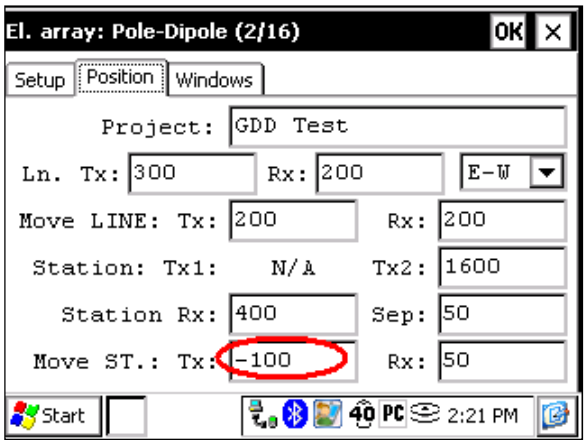

6) Continue the survey. When Tx2 station position is 1200, you have to change the spacing back to 100.




7) When the line is completed press NEXT LINE to increment the LTx.

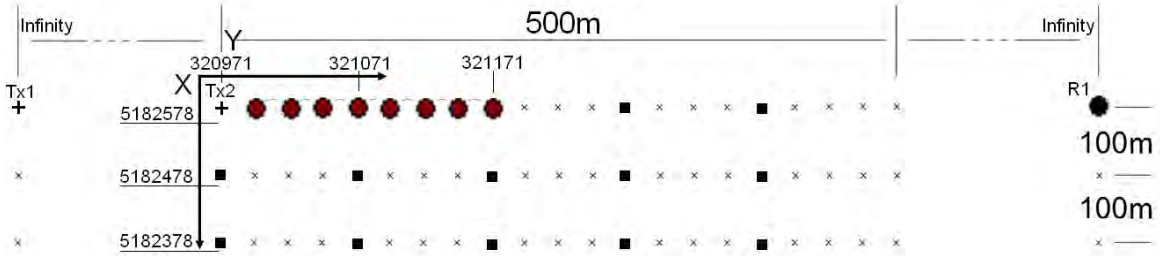


8) When the line is done, change the Move ST.: TX: to -100 or the Tx2 position to 0 depending on where you are starting the next line.

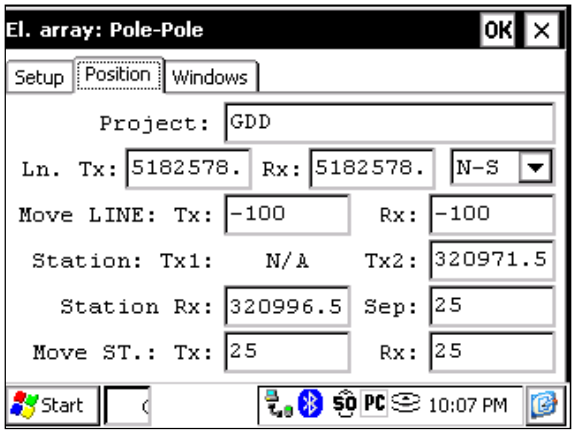


***GPS Positions***

Setting GPS positions instead of nominal positions

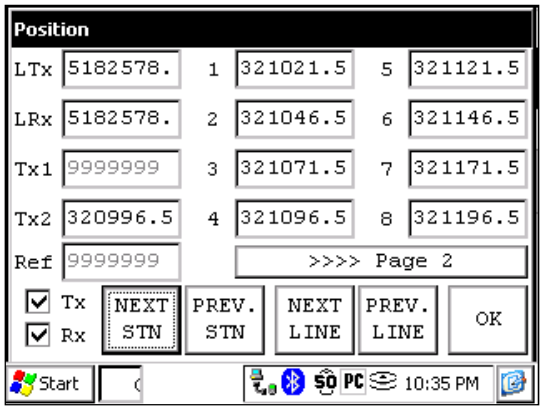



Starting position: X – 320971.52 Easting Y – 5182578.35 Northing

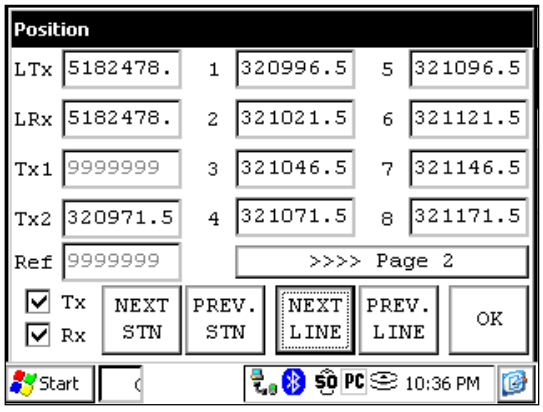



Instead of using a relative position system (the starting position being 0,0), you can enter GPS position in meters in the Line TX, Line RX, Tx1, Tx2 and Station Rx cases. You can enter any number between -9999999 and 9999999.

Next Station




Next Line



# Annex 3 – Example Dump File

Version PPC: 0.4.2.10 Version Rx:0.2.5.1 Rx SN:1050
Project: 25mai2009
Windows: 20 Setting: Arith. Delay (ms): 240 Timing (ms): 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80

| Mem | Date / Time | El-array | LineTx | LineRx | Dir | n | Tx | Tx | Rx | Rx | Contact | Rho |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 25/05/2009 13:37:40 | P-DP | 0.00 | 20.00 | N-S | 0.0 | 9999999.00 | 0.00 | 20.00 | 30.00 | 3.8 | 26.78 |
| 1 | 25/05/2009 13:37:40 | P-DP | 0.00 | 20.00 | N-S | 0.0 | 9999999.00 | 0.00 | 30.00 | 40.00 | 7.1 | 23.89 |
| 1 | 25/05/2009 13:37:40 | P-DP | 0.00 | 20.00 | N-S | 0.0 | 9999999.00 | 0.00 | 40.00 | 50.00 | 11.7 | 21.96 |
| 1 | 25/05/2009 13:37:40 | P-DP | 0.00 | 20.00 | N-S | 0.0 | 9999999.00 | 0.00 | 50.00 | 60.00 | 17.6 | 15.30 |
| 2 | 25/05/2009 13:40:55 | P-DP | 0.00 | 20.00 | N-S | 0.0 | 9999999.00 | 0.00 | 20.00 | 30.00 | 3.9 | 27.28 |
| 2 | 25/05/2009 13:40:55 | P-DP | 0.00 | 20.00 | N-S | 0.0 | 9999999.00 | 0.00 | 30.00 | 40.00 | 7.2 | 25.05 |
| 2 | 25/05/2009 13:40:55 | P-DP | 0.00 | 20.00 | N-S | 0.0 | 9999999.00 | 0.00 | 40.00 | 50.00 | 11.6 | 20.74 |
| 2 | 25/05/2009 13:40:55 | P-DP | 0.00 | 20.00 | N-S | 0.0 | 9999999.00 | 0.00 | 50.00 | 60.00 | 17.5 | 17.61 |

| Sp | SpMin | SpMax | Vp | ErrVp | Sym(%) | M | ErrM | In | Time | Stack | M01 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| -5.8 | -11.4 | -2.2 | 6.300 | 0.027 | 92 | 19.210 | 11.87 | 194.0 | 2000 | 22 | 42.717 |
| -6.1 | -8.0 | -3.4 | 3.965 | 0.021 | 93 | 24.892 | 7.226 | 194.0 | 2000 | 22 | 35.342 |
| -5.5 | -17.6 | 2.8 | 2.570 | 0.116 | 81 | 154.79 | 33.56 | 194.0 | 2000 | 22 | 146.00 |
| -16.3 | -25.4 | -4.4 | 1.303 | 0.167 | 75 | -166.96 | 22.41 | 194.0 | 2000 | 22 | -170.10 |
| -7.0 | -13.1 | -2.1 | 11.879 | 0.072 | 91 | 26.499 | 1.815 | 359.0 | 2000 | 28 | 36.966 |
| -8.3 | -10.5 | -5.4 | 7.692 | 0.012 | 90 | 21.118 | 0.878 | 359.0 | 2000 | 28 | 39.927 |
| -2.3 | -11.7 | 7.7 | 4.493 | 0.040 | 90 | -24.797 | 18.83 | 359.0 | 2000 | 28 | -14.261 |
| -32.4 | -50.3 | -14.1 | 2.776 | 0.031 | 84 | 149.53 | 43.24 | 359.0 | 2000 | 28 | 155.96 |

Header :

| | |
|---|---|
| Version PPC : | Version of the Rx program on the PDA |
| Version Rx : | Version of the Rx software |
| Rx SN : | Serial number of the IP Receiver |

| | |
|---|---|
| Project : | Name of your project |

| | |
|---|---|
| Windows : | Number of windows (depending on the selected mode) |
| Settings : | Selected mode (Section 7) |
| Delay : | Delay in ms before the first window (depending on the selected mode) |
| Timing : | Timing of each window (depending on the selected mode) |

Readings:

| | |
|---|---|
| Mem: | Memory number |
| Date / Time: | Date and Time |
| El- Array: | Electrode Array |
| Line Tx: | Transmitter Line Label |
| Line Rx: | Receiver Line Label |
| Dir: | Line Direction (North-South or East-West) |
| n: | Number or Rank of dipole |
| Tx: | First electrode of the transmitter |
| Tx: | Second electrode of the transmitter |

| | |
|---|---|
| Rx: | First electrode of the dipole |
| Rx: | Second electrode of the dipole |
| Contact: | Soil resistance in kOhm |
| Rho: | Resistivity in Ohm*m |
| Sp: | Self potential in mV |
| SpMin: | Minimum value of SP in mV |
| SpMax: | Maximum value of SP in mV |
| Vp: | Primary voltage in mV |
| ErrVp: | Error in % of the Vp |
| Sym(%): | Symmetry in % |
| M: | Chargeability in mV/V |
| ErrM: | Error in % of M |
| In: | Current in mA |
| Time: | Transmitter timing in ms |
| Stack: | Number of stacks |
| M01 – M20: | Windows of chargeability |

** Date and Time are those of the PDA for the *.gdd* file and GPS time for the *.gps* file.